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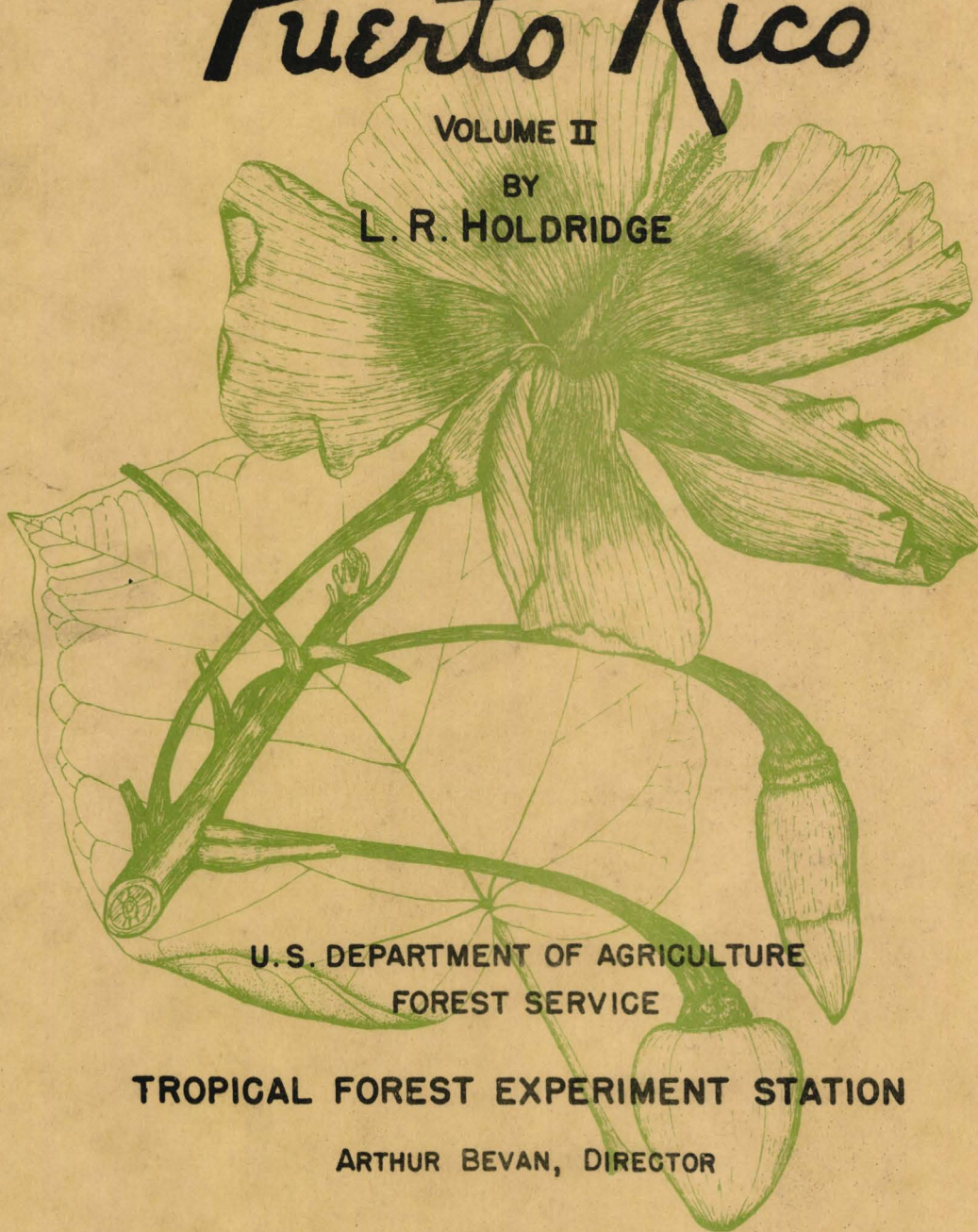


Trees of Puerto Rico

VOLUME II

BY

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U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

TROPICAL FOREST EXPERIMENT STATION

ARTHUR BEVAN, DIRECTOR

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The illustrations face their respective descriptions.

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FOREWORD

This is the second volume of a series which will ultimately cover all of the tree species found in Puerto Rico. It contains a description of 50 additional species.

We again solicit corrections and criticisms so that when the present series is completed revision and editing will permit early printing in one volume.

As in Volume I, the illustration and description of each species have been so arranged that it is possible to compare them without turning a page. The order of the species and the nomenclature are taken from Britton and Wilson's "Botany of Porto Rico and the Virgin Islands". The common names presented come from the literature and from local usage. To make the descriptions best serve their purpose every effort was made to simplify them as much as possible. Technical terms were used only where they were vital to the accuracy of the description. A short glossary is included for the definition of these terms.

There has been no attempt to be strictly original and information of interest or of assistance in identifying the species has been drawn from all available sources. Acknowledgement is, therefore, made to all those who through previous publications and writings have helped to make this paper a possibility. A list of the chief references used is included at the end. In addition, many others have assisted by sending in specimens and providing local information. To the Caribbean National Forest and the Work Projects Administration who provided workers for making the drawings, and to the U. S. Army, Puerto Rican Department who made the multilith plates which made possible reproduction of the drawings grateful acknowledgement is made.



FABACEAE

Pictetia aculeata (Vahl) Urban

Tachuelo, Fustic

This species, restricted to Puerto Rico, Hispaniola, and the Virgin Islands, is common in thickets and pastures at low and middle elevations in the dry southern and eastern districts of the island.

It is a shrub or small tree, often several-stemmed, growing to 10 meters in height. The old bark separates in large flakes.

The odd-pinnate leaves are 6 to 12 cm. long, with 9 to 25 orbicular ovate leaflets from 1 to 2 cm. long. Their most distinctive characteristic consists of the bristle tip or spine at the rounded apex. The stipules are also rigid spines.

The bright yellow pea-shaped flowers are borne in several-flowered racemes on slender pedicels. The flowers are attractive, and are borne in great profusion, brightening the landscape considerably during the flowering season. For this reason the tree might have possibilities as an ornamental.

The fruit is a linear, slightly curved, indehiscent pod 2 to 5 cm. long with 2 to 6 joints.

The heartwood is extremely hard, heavy, and durable. It is dark brown and in general appearance looks like lignum vitae. Most of the larger trees have been felled in the past and the main use of the smaller material now available on the island is for fence posts.

PLATE - 2/3 natural size.



FABACEAE

Drepanocarpus lunatus (L.F.) G.F.W. Meyer

Palo de hoz, Escambrón

This species is found in Hispaniola, the Lesser Antilles from Guadeloupe to Trinidad, continental tropical America, and tropical Africa. In Puerto Rico it grows in coastal thickets and woods and on brackish sites within the mangrove swamps.

Although usually shrubby, it occasionally becomes tree-like and reaches a height of 7 meters and a diameter of over one dm. The branches are armed with curved stipular spines, about 4 to 10 mm. long.

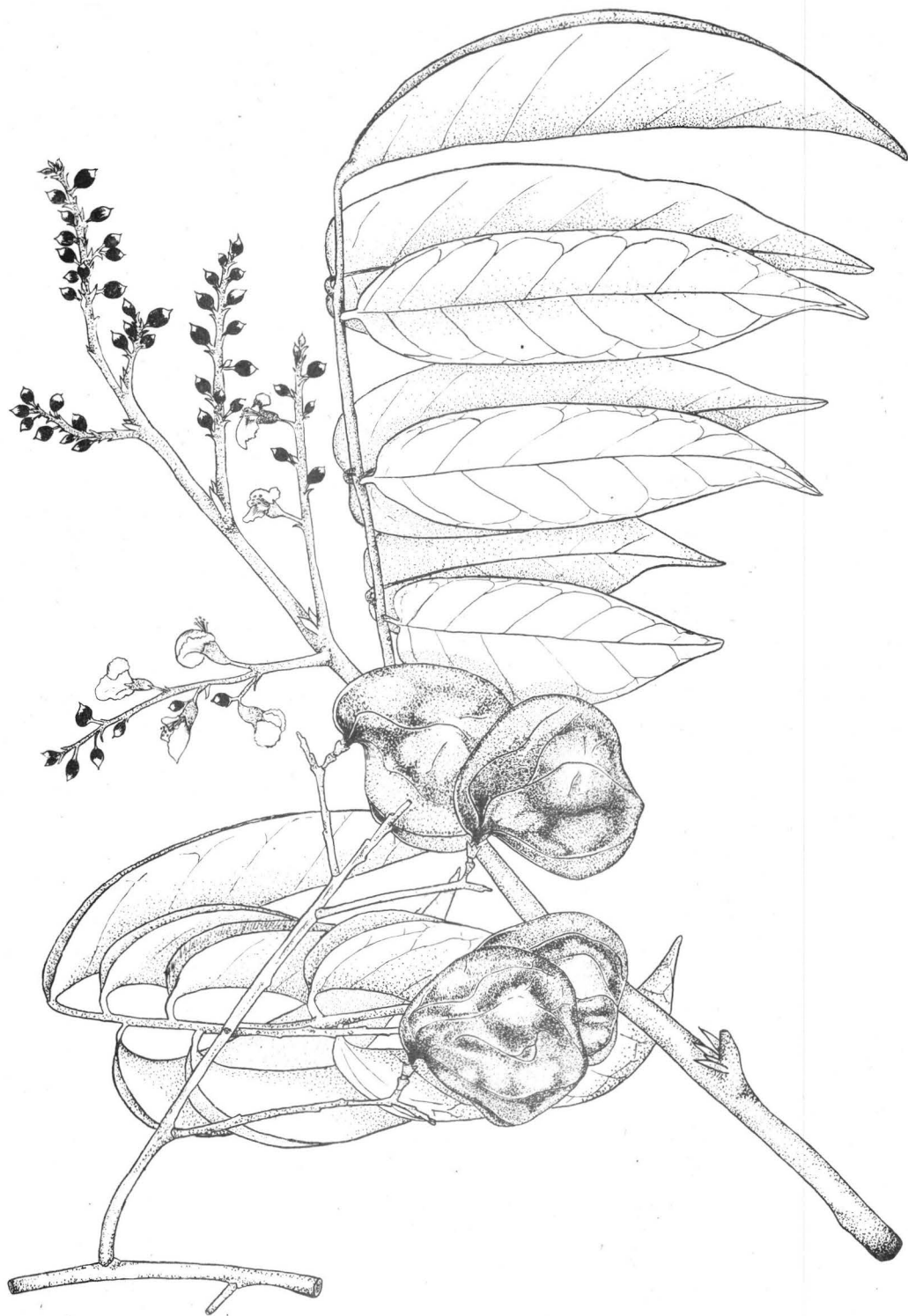
The leaves are unevenly pinnate, with 5 to 11 short-stalked leaflets arranged mostly alternately on the rachis. The papery leaflets are oblong or obovate, 2 to 5 cm. long, rounded at the apex and somewhat narrowed at the base.

The flowers are borne in terminal or axillary, many-flowered panicles, 6 to 15 cm. long. The corolla is less than 1 cm. in length, and of a purple to lilac color.

The fruit is a flat, leathery, one-seeded pod, curved into a circle which is 2 to 4 cm. broad. The resemblance of this fruit to a miniature sickle has given rise to the generic name and to the Spanish common name, "Palo de hoz".

No economic use is known for this tree.

PLATE - natural size.



FABACEAE

Pterocarpus officinalis Jacq.

Palo de pollo, Sangre de drago, Swamp blood wood.

The occurrence of this species in continental tropical America and the Lesser Antilles, and the fact that it is largely confined to the eastern part of Puerto Rico leads to the belief that it may have reached Puerto Rico relatively recently from the southeast. In Puerto Rico it grows on the edges of mangrove swamps where high tides cover its roots. It is also found at middle elevations in mountain forests where it is largely restricted to swamps and the banks of streams.

It is a large tree sometimes 30 meters high, glabrous throughout, except for the minutely pubescent inflorescence. On wet sites it develops thin ribbon buttresses at the base of the trunk, which are very striking. When the bark is cut it exudes a blood-red sap, a very definite character for the identification of the species. This resin was used formerly in medicine under the name of "Dragon's blood".

The pinnately compound leaves are 2 to 4 dm. long with 5 to 9 alternate, entire, ovate to ovate-oblong, or ovate-lanceolate leaflets, 5 to 12 cm. long, acuminate at the apex and rounded or obtuse at the base.

The numerous yellow or yellowish brown flowers are borne in loose panicles about as long as the leaves. The large petal known as the standard is sometimes violet colored.

The fruit is an irregularly shaped pod, 3 to 5 cm. broad, brownish in color, broadly winged along one side, and containing one seed.

The light brown wood is weak and not durable. It is used somewhat by the natives to make floats for fish-nets and for ox-yokes. In former times sections of the thin buttresses were used in the process of washing for gold.

PLATE - 2/3 natural size.



FABACEAE

Andira inermis H.B.K.

Moca, Cabbage tree, Angelin tree

This tree has a wide tropical range, including the West Indies, southern Mexico, Central America, much of South America and western Africa. It is common throughout the island, in pastures, along roads, in coffee plantations, and in woodlands.

It is a medium-sized, deciduous tree, growing to 20 meters in height. The young twigs and inflorescence are hairy, the bark gray, narrowly fissured, and malodorous.

The alternate, odd-pinnate leaves are 2 to 4 dm. long with 7 to 13 leaflets. The leaves vary greatly in color on different trees, being light yellow when new, and of several different shades of green at maturity. The opposite, short-stalked leaflets are oblong or elliptic and 5 to 8 cm. long.

The pinkish-mauve, pea-like flowers, borne in large panicles 3 dm. or more in length, make the tree very attractive when in bloom.

The fruit is a green egg-shaped pod about 4 cm. long containing one seed. The seed together with the bark is used as a purgative, vermifuge, and narcotic but in large doses is a dangerous poison.

The wood is strong, durable, and fairly heavy. The color varies from yellowish to dark brown. On the tangential surface some of the darker material looks like palm while the lighter material resembles hard pine. The wood is employed for construction, piling, boat building, handles, and canes.

The tree has been used recently on the island for reforestation purposes. The large seeds were planted directly in the field and germination was very satisfactory. However, field mice cut the stems of many of the seedlings causing heavy losses in the plantations. Growth is rather slow.

PLATE - 2/3 natural size.



FABACEAE

Erythrina Poeppigiana (Walp.) O.F. Cook

Bucare, Bucayo, Bois
immortelle

This species, a native of Peru, has been introduced into the West Indies and other countries of tropical America. It has escaped from cultivation on the island after planting in coffee farms and along the roads in moist districts at low and middle elevations.

It is a large, deciduous tree, growing to 30 meters in height, with trunk and branches armed with stout prickles, those of the trunk deciduous. The bark is smooth and pale brown in color.

The thin, alternate, tri-foliate leaves are often 3 dm. long, the leaflets broadly ovate or sometimes broader than long, from 7 to 23 cm. in length, and glabrous.

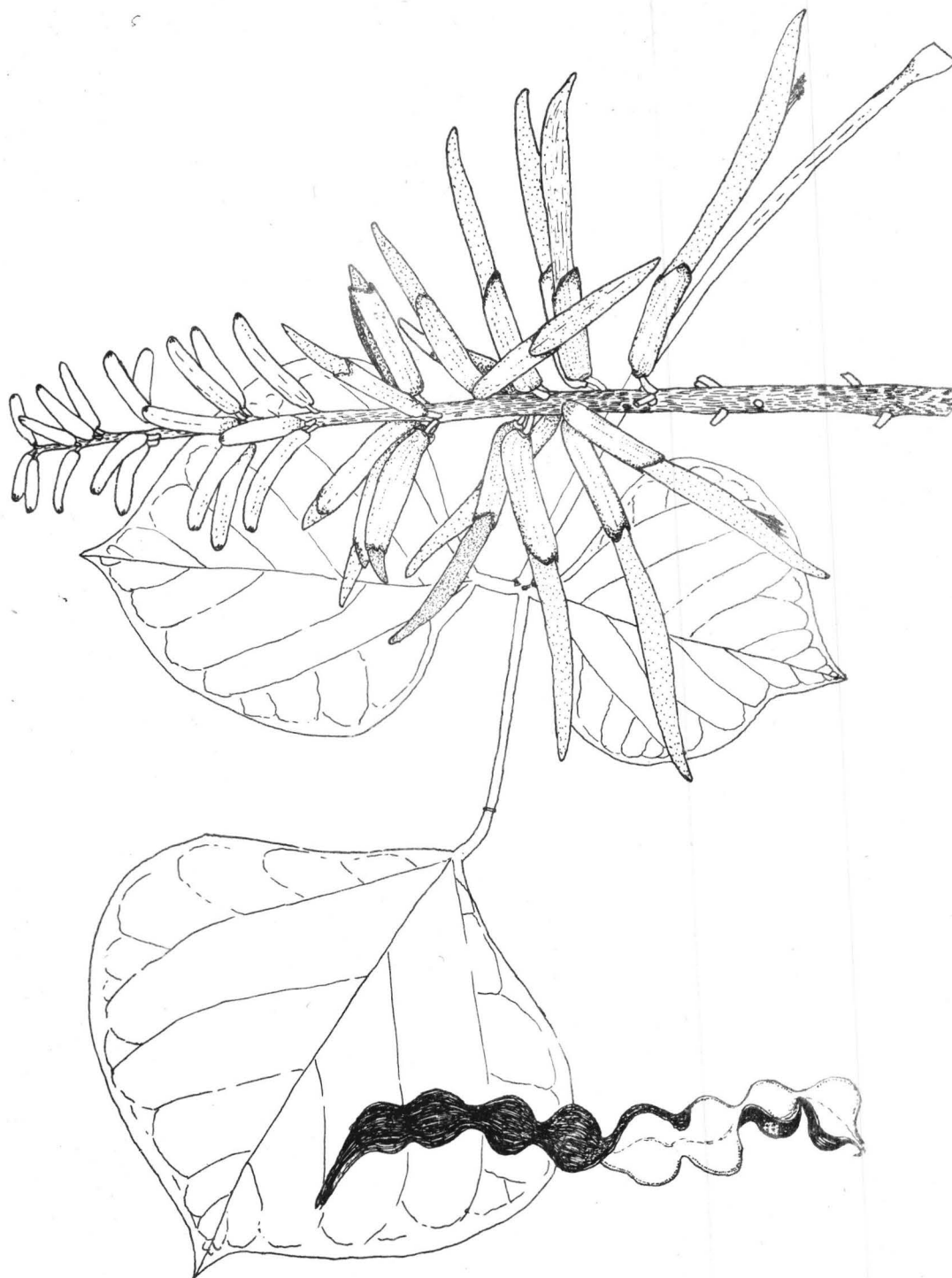
The orange scarlet flowers occur in large racemes, of which the illustration shows only one branch. Each individual flower has a large standard, the upright petal, 3 to 4 cm. long and tapering to the tip. The keel-petals, united except at the tips, are nearly as long as the standard and enclose the long stamens. Flowering takes place in the spring before the appearance of the new leaves, at which time it is covered with a mass of bloom and is very conspicuous, even from a distance.

The thin, linear, pointed pods range up to 13 cm. in length. They dehisce releasing the flat, dark-brown seeds.

The tree was formerly planted widely as coffee shade, but it is not recommended for that purpose. In Trinidad, it is extensively used in cacao plantations.

The wood is soft and perishable.

PLATE - 2/3 natural size.



FABACEAE

Erythrina Berteroana Urban

Machete

The machete, native to Cuba, Hispaniola, and Colombia, is found along roadsides, and in fence rows over the greater part of the island and is naturalized in some sections.

It is a small, unarmed, glabrous tree, growing to 8 meters in height. Usually the trunk branches near the ground.

The trifoliate leaves have long petioles, ranging to 4 dm. in length, with ovate to rhombic leaflets, 5 to 14 cm. long. The tips are short-pointed or acute; the bases broadly wedge-shaped or nearly square. The leaves are light-colored beneath.

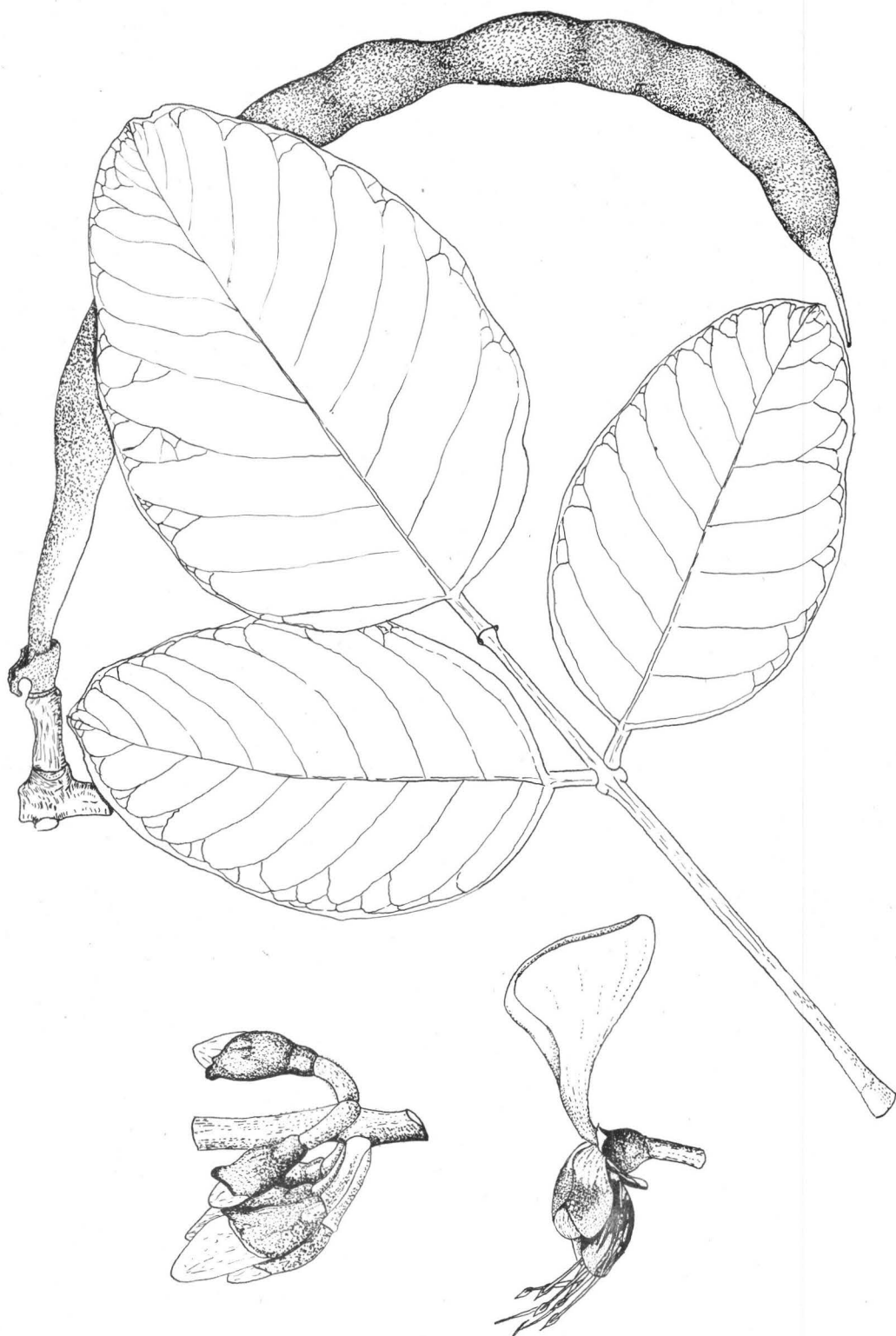
The coral pink flowers are borne in large racemes ranging to 3 dm. in length. The flowers gave the name to the tree, their form being very suggestive of the machete, the green calyx representing the handle, and the long, pink standard having the proportions of the blade. The wing and keel petal are enclosed by the long standard. The stamens may protrude a short distance near the end. The flowers are 6 to 8 cm. in length.

The pod is about 10 cm. long, curved and constricted between the seeds, and it has a beaked tip at the end. The seeds are oblong and of a bright vermillion color.

The wood is light, soft, and weak, and of little importance.

The tree can be propagated by seeds, but is usually reproduced by cuttings. Since these root and grow readily, the species is often used for live fence posts. It has been used extensively as a support tree in vanilla plantations on the island for which its ease of propagation and habit of growth made it desirable. However, it is susceptible to severe attacks by defoliating insects, a characteristic which tends to offset its good qualities.

PLATE - 2/3 natural size.



FABACEAE

Erythrina glauca Willd.

Bucayo, Gallito

This tree, found throughout the West Indies, in Venezuela, and in Central America, seems to prefer swampy ground and forms dense, pure stands in swamps near the Pacific coast of the continent. It has apparently been introduced into Puerto Rico, where it occurs along roadsides and river banks in the northern parts of the island and is especially common near Bayamón, Río Piedras, and Caguas.

It is a medium-sized deciduous tree. The trunk and branches are armed with prickles, at least when young. The bark is fairly smooth and brownish in color.

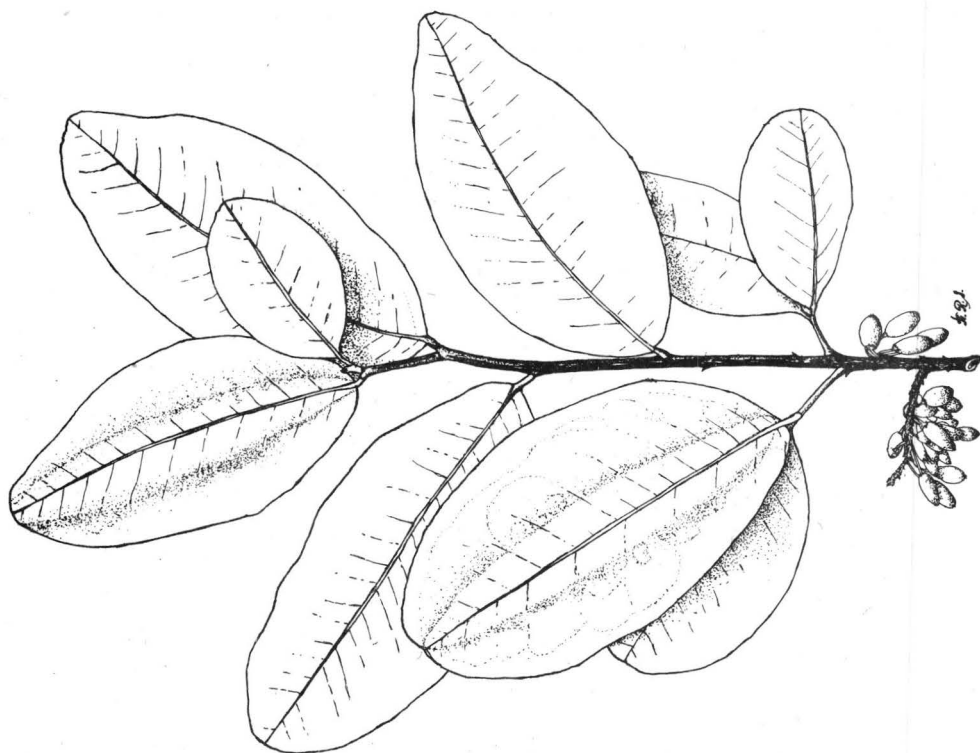
The trifoliate leaves are often 3 dm. long; the leathery leaflets are ovate to ovate-elliptic, 6 to 12 cm. long, smooth above, and paler or whitish beneath. They are said to assume a vertical position in the evening.

The flowers occur in large, showy racemes, 1 to 2 dm. long, almost covering the tree when in bloom. They are of a cream color, at first but later turn orange.

The pod is linear, curved, constricted between the seeds, and ranges to 3 dm. in length. The seeds are oblong, brownish in color, 1.5 to 1.8 cm. long, and rounded at both ends.

The wood is soft, light, and weak and has little or no use. In Venezuela, the tree is used for shade in plantations of coffee and cacao or as live fence posts as it sprouts from cuttings.

PLATE - 2/3 natural size.



ERYTHROXYLACEAE

Erythroxylon areolatum L.

Indio, False cocaine

Outside of Puerto Rico this species is found in Mona Island, the Bahamas, Cuba, Jamaica, Hispaniola, and Colombia. On the island it grows in thickets and on hillsides along the coast in the dry southwestern region.

It is a shrub or small tree, growing to 10 meters in height.

The simple, entire, alternate leaves are oblong to obovate, 5 to 13 cm. long, obtuse or notched at the apex and narrowed at the base. The clear color of the leaves is very attractive and distinctive, being like the other species of Erythroxylon a dark dull green above and very pale green below. It is readily distinguished from other members of the genus on the island as the leaves are areolate below by two lines parallel to the prominent midrib.

The fragrant, small, white or yellowish-white flowers appear with or before the new leaves.

The fruits are 6 to 9 mm. long, turning from green to red at maturity.

The wood is hard, heavy, strong, and reddish in color as indicated by the generic name, "Erythroxylon" of Greek derivation meaning red-wood.

PLATE - 2/3 natural size.



ZYGOPHYLLACEAE

Guaiacum officinale L.

Guayacán, Lignum vitae

The Guayacán, found throughout the West Indies and in continental tropical America, grows in Puerto Rico along the south coast from Guayama to the point of Cabo Rojo, being found most commonly in the woodlands and pastures near the southwestern corner of the island.

It is a small evergreen tree, growing to 10 meters in height, usually with a short trunk and spreading crown. The bark is smooth, brownish to grayish and peels off in large plates, giving a rather mottled effect to the tree.

The evenly pinnate leaves are opposite, from 3 to 9 cm. in length, and composed of 2 or 3 pairs of oval to obovate, glabrous leaflets rounded at the tips.

The bright blue flowers, clustered in the axils, are very ornamental. There are 4 to 5 nearly obovate petals about 12 mm. long.

The yellowish, leathery fruit is usually two-celled and somewhat winged. The seeds are about twice as long as broad and number about 1,800 per pound. When planted in the nursery, germination takes place from 21 to 23 days after sowing.

The olive-brown to dark brown or nearly black heartwood of this tree is extremely hard and heavy, having a specific gravity of from 1.17 to 1.32. The wood is difficult to work but takes a high polish and is very durable. Due to its great strength and tenacity and its self lubricating properties, it has been the only wood suitable for bearings in steamship propeller shafts. Other uses are for mallets, pulley sheaves, caster wheels, bowling balls and turned novelties.

The resin known as "guaiac" by the drug trade is extracted from this species. Formerly the wood attained great fame in Europe as a remedy for syphilis. However, it is said to have no pronounced beneficial effects. In Kingston, Jamaica, the species is commonly planted in gardens and yards as an ornamental tree.

PLATE - 2/3 natural size.



ZYGOPHYLLACEAE

Guaiacum sanctum L.

Guayacán blanco, Guayacán,
Lignum vitae, Bastard
lignum vitae

This species occurs in the southwestern dry section of Puerto Rico, on Mona Island, in Florida, the Bahamas, Cuba, Hispaniola, and Yucatán.

It is a spreading, round-headed evergreen tree, sometimes 10 meters high, with a short stout trunk and slender whitish branchlets which are slightly angled and conspicuously enlarged at the nodes. The bark is light gray in color and deeply fissured vertically, a character which readily distinguishes this species from G. officinale with its mottled, plated bark.

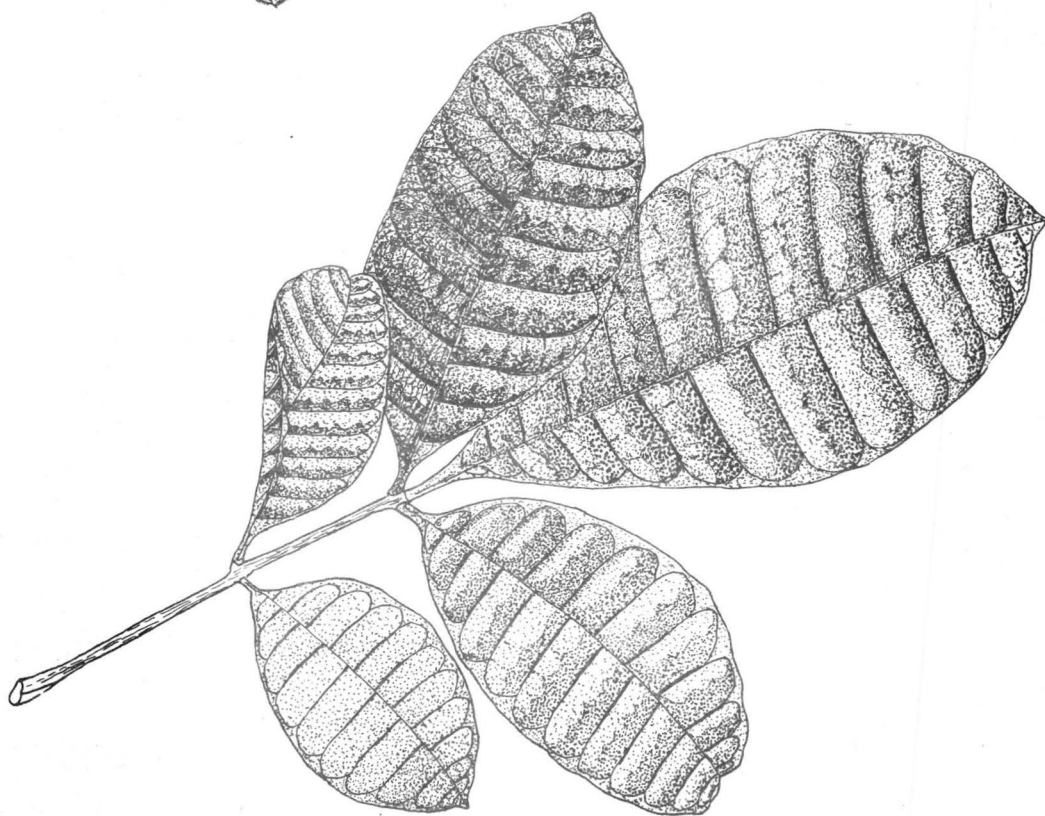
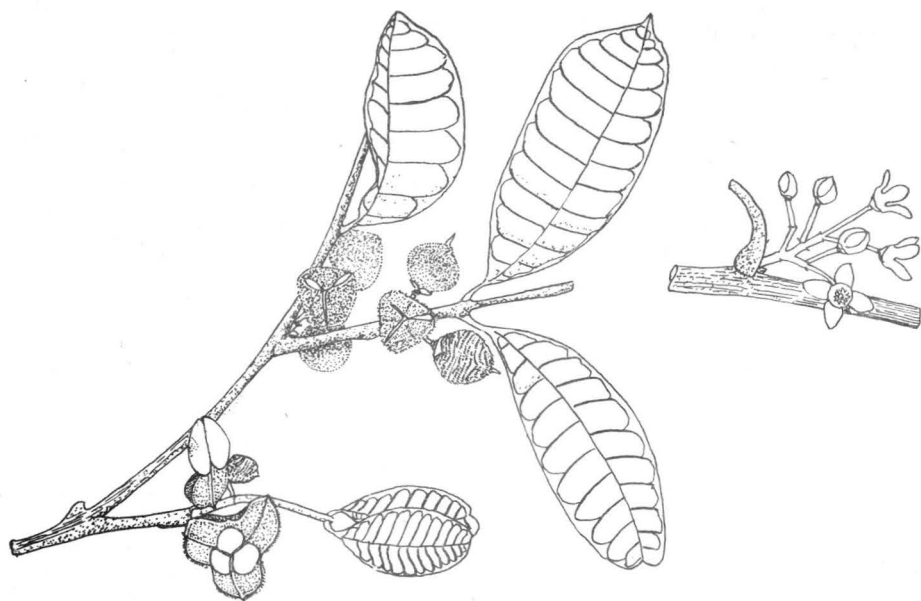
The leaves are 4 to 10 cm. long, evenly pinnate and composed of 4 to 10 oblong to obovate or oblanceolate, sessile and glabrous leaflets. The numerous leaflets are another important character differentiating this tree from G. officinale.

The blue- or purple-petalled flowers are borne singly in the axils of the leaves.

The fruit is yellow to orange in color, usually 4- or 5-celled, and splits open, showing the dark brown or black seeds with their scarlet arils.

The wood is similar in appearance to that of G. officinale and is employed similarly but is somewhat less highly esteemed.

PLATE - 2/3 natural size.



MELIACEAE

Trichilia pallida Sw.

Gaeta, Ramoncillo

This species is restricted to Puerto Rico, Cuba, and Hispaniola. It is fairly common in moist and wet districts in the island at all elevations.

It is a small, evergreen tree, growing to 15 meters in height, but ordinarily smaller and sometimes shrub-like. The young twigs are brown and hairy, and marked with small, elliptic or oval lenticels.

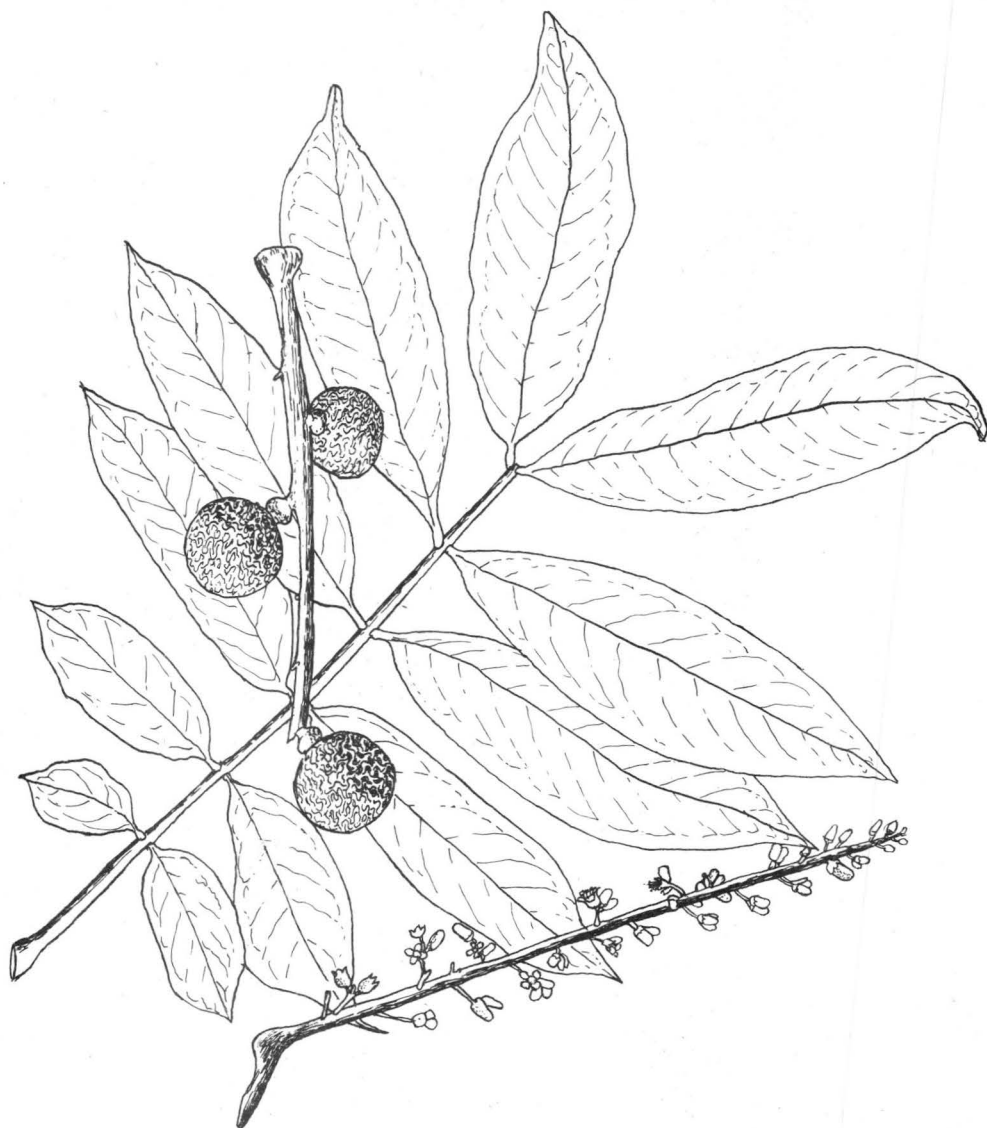
The alternate, odd-pinnate leaves, 12 to 25 cm. long, consist of 3 to 7 variously shaped leaflets, 3.5 to 15 cm. long, 2 to 6 cm. wide, the terminal one larger. They are usually short-pointed at the apex, narrowed at the base and glabrous on both sides. They are wrinkled, with the veins prominent below.

The greenish yellow flowers occur in small clusters in the axils of the leaves. The calyx is 4-lobed and the four elliptic petals, 5 to 6 mm. long, are covered on the back with flat-lying hairs.

The fruit is a hairy, 3-lobed, greenish capsule 1 to 1.5 cm. long and about 8 mm. broad. It splits open widely, disclosing 3 whitish ellipsoid or ovoid seeds about 6 mm. in length.

The wood is hard, heavy and rather fine-textured, but is seldom used because of the small size of the trees.

PLATE - 2/3 natural size.



MELIACEAE

Guarea Guara (Jacq.) P. Wilson

Guaraguo

Outside of Puerto Rico this species occurs in Hispaniola, Cuba, and continental tropical America. It is found commonly throughout the moist districts of the island at lower and middle elevations.

It is a large evergreen tree, attaining a height of 30 meters or more and a diameter of more than 1 meter. The trunks of large trees are conspicuously fluted. The outer bark is dark brown, fissured, and fairly thick; the inner bark is pinkish.

The leaves are equally pinnate, 1 to 6 dm. long with few to many pairs of glabrous, wrinkled, shiny, dark green leaflets, elliptic to elliptic-lanceolate or somewhat obovate in shape, and 8 to 24 cm. long. They are short-acuminate at the apex, acute and equilateral at the base, and punctate with slender often curved translucent lines. The leaves sometimes develop in an odd way which makes them at a casual glance look like branches, in that new leaflets are forming at the tip when the lower leaflets have already become mature.

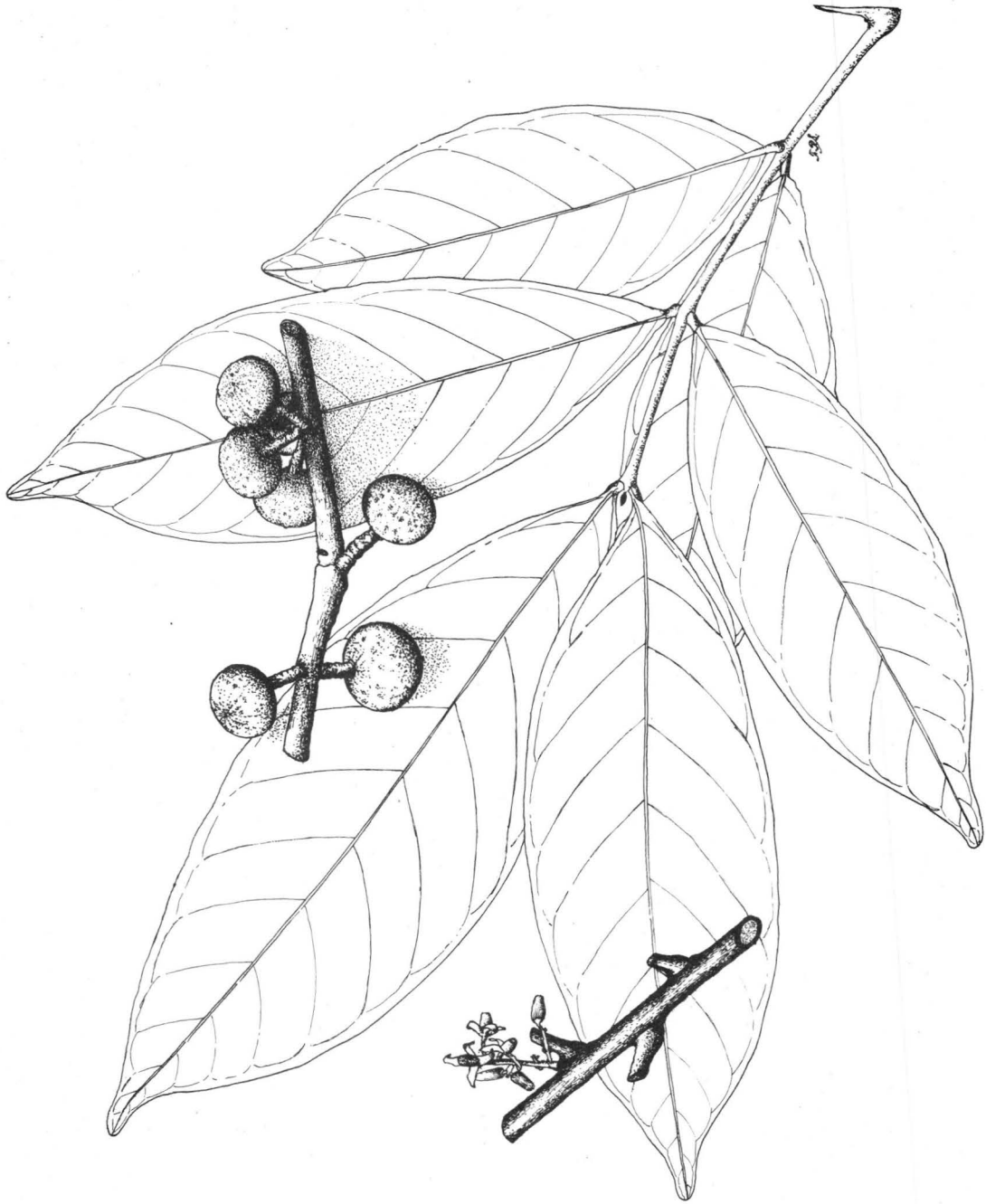
The cream-colored flowers occur in narrow drooping panicles, 5 to 40 cm. long.

The fruit is a nearly globose, brown, woody capsule 1.5 to 2 cm. in diameter, containing a few red-coated seeds.

The wood resembles mahogany and Spanish cedar. It is light reddish brown, hard, moderately heavy, and takes a high polish. It is used for furniture, wagons, implements, and construction.

It is a fairly rapid grower and is commonly left in coffee plantations for shade and a source of lumber when mature.

PLATE - 2/3 natural size.



MELIACEAE

Guarea ramiflora Vent.

Guaraguadillo

The guaraguadillo, endemic to Puerto Rico, is found in forests and woodlands in wet or moist sites.

It is a shrub or small tree, rarely attaining a height of 10 meters.

The leaves are equally pinnate, 4 to 17 cm. long with 2 to 6 or occasionally more oblong to broadly elliptic leaflets, 7 to 22 cm. long. These are acuminate at the apex, acutish or somewhat rounded at the base, glabrous above, hairy below on the midrib and lateral veins, and punctate with numerous small pellucid dots. At first acquaintance this may be confused with the guaraguao but the fewer leaflets and the dull, pale gray-green, flattened upper surface of its leaves distinguish it readily in the forest from the shiny, dark green, wrinkled leaves of the latter.

The flowers occur along the branches or in short panicles and are distinct from those of the other Guarea by being pink or reddish in color.

The fruit is a somewhat globose, rusty brown capsule ranging to 2.5 cm. in diameter.

The wood is similar to that of guaraguao. At present it is difficult to find any stems of sufficient size for uses other than firewood or small poles.

PLATE - 2/3 natural size.



EUPHORBIACEAE

Croton poecilanthus Urban

Sabinón

This species, found only in Puerto Rico, is quite common at middle and higher elevations in the eastern mountains.

It is a small evergreen tree, growing to 12 meters in height and 3 dm. in diameter, with smooth, dark gray bark. The twigs as well as the under surface of the leaves, the petioles, and the inflorescence are covered with dense fine hairs.

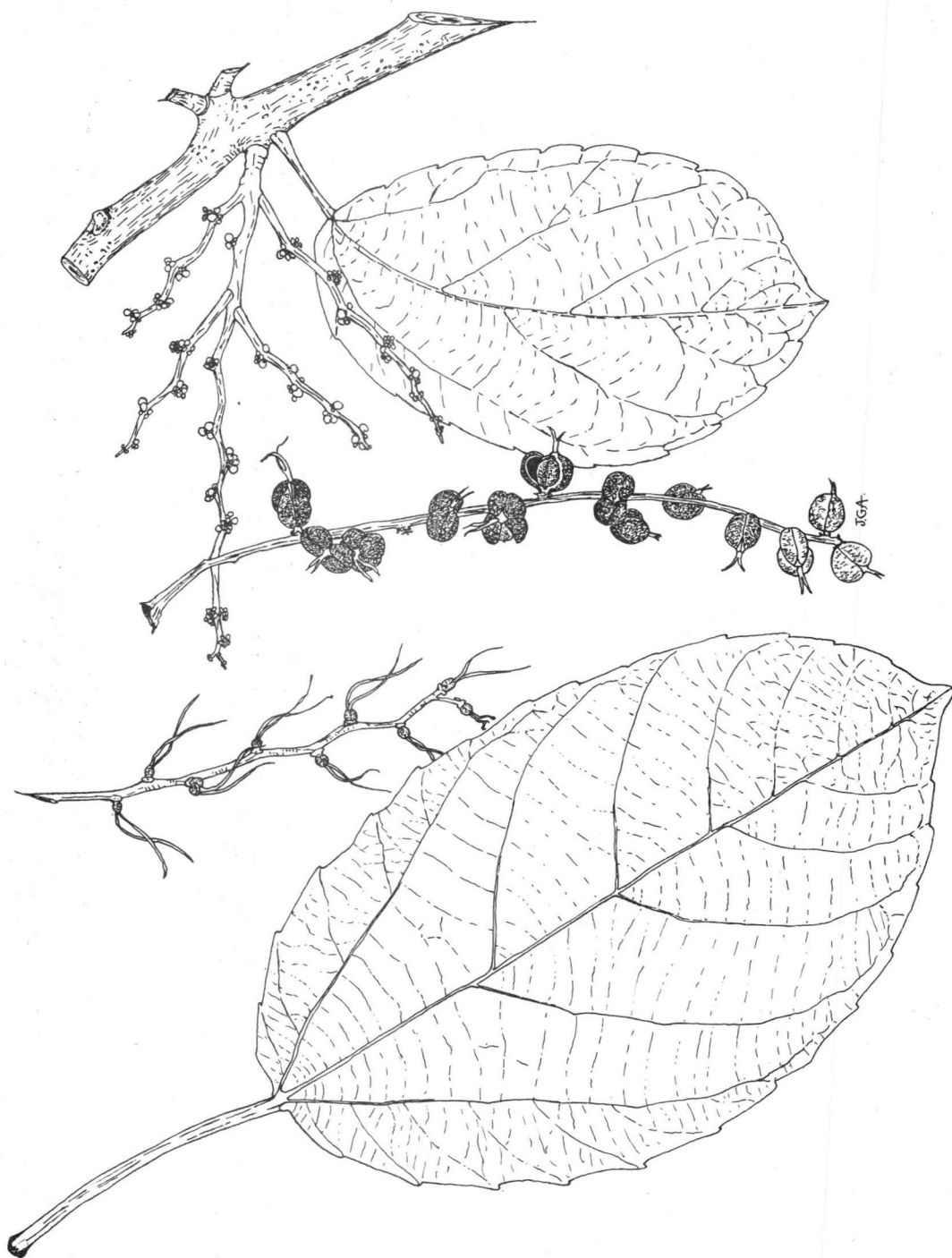
The simple, alternate, leathery leaves are entire or finely serrate, elliptic or elliptic-obovate in shape, 8 to 15 cm. long, acute, obtuse or short acuminate at the apex, and obtuse or narrowed at the base. The petioles range to 6 cm. in length, and there are two glands where they join the leaf blade. Seedlings of this species are very similar to those of laurel sabino but can be distinguished by the lack of ringed stipular scars characteristic of the latter.

The small, white flowers occur in many-flowered spicate or racemose inflorescences. The staminate have short petals and about 20 stamens. The pistillate have only a short calyx and an ovary topped with a branched style.

The fruit is an ovoid brownish-green capsule, 10 to 15 mm. long, which splits along 3 lines, releasing the seeds.

The wood is of poor quality, and is used only for charcoal or fuelwood.

PLATE - 2/3 natural size.



EUPHORBIACEAE

Alchornea latifolia Sw.

Achiotillo, Palo de cotorra

This tree, found in Tortola, Hispaniola, Jamaica, Cuba, Mexico and Central America, is common in moist or wet districts at all elevations in Puerto Rico.

It is a medium-sized tree, growing to 20 meters in height and 1 meter in diameter. The bark is smooth and brown in color. The young twigs and leaves are minutely stellate-pubescent.

The simple, alternate, 3-nerved leaves are ovate to broadly elliptic, short-pointed at the apex, and obtuse or somewhat heart-shaped at the base. They have dentate edges, the teeth tipped with small glands. The leaves are large, the blades being 8 to 25 cm. long, and the rather stout petioles 4 to 12 cm. long. Two or four glands are found where the blade and petiole meet.

The small, greenish yellow male and female flowers occur separately, the male on branched panicles, the female in spikes with 2 styles 1 to 2 cm. long.

The fruit is a 3-lobed capsule about 10 mm. in diameter, tinged with purple at maturity.

The wood is soft and light and finds little use.

PLATE - 2/3 natural size.



EUPHORBIACEAE

Alchorneopsis portoricensis Urban

Palo de gallina

The palo de gallina is restricted to Puerto Rico and Hispaniola. Scattered individuals are found at middle and higher elevations in the mountain forests of the island.

It is a medium-sized tree, growing to 15 meters in height and 8 dm. in diameter. The young twigs are finely hairy; the bark on older trees is light gray and smooth.

The simple alternate leaves are smooth, papery, light green in color, and wavy edged or with widely spaced shallow serrations. They are elliptic to obovate-elliptic, 5 to 10 cm. long with rather long slender petioles, and three nerved from the base. They turn yellow before falling. The tree is similar in appearance to Alchornea latifolia but is easily distinguished from the latter by its narrower leaves with less prominent serrations.

The male and female flowers are borne on separate trees in finely hairy spikes 3 to 6 cm. long. They are small and greenish.

The fruit is a three-lobed dehiscent capsule about 5 mm. in diameter. The seeds are about 3 mm. in length.

The wood is light and soft and finds little use on the island.

PLATE - 2/3 natural size.



CYRILLACEAE

Cyrilla racemiflora L.

Palo colorado, Southern
leatherwood

This species occurs in the southeastern United States, Cuba, Jamaica, Hispaniola, from Guadeloupe to St. Vincent in the Lesser Antilles and in northern South America. It is fairly common above 300 meters in the higher mountains of the island.

It is a large, deciduous, wide-spreading tree, growing to 30 meters in height and 2 meters or more in diameter. In exposed situations or near the northern limits of its range, it is commonly reduced to a shrub or small tree. It has slender twigs and reddish bark which is shed in long irregular strips.

The alternate, simple, entire leaves are lanceolate or oblanceolate, 5 to 10 cm. long, and 6 to 25 mm. wide, with rather stout petioles. They are usually confined to the extremities of the branches, and turn red or scarlet just before falling.

The small white flowers occur in dense, narrow racemes, 5 to 15 cm. in length.

The dry fruits are only 2 mm. long, and each contains 2 or 3 light brown seeds.

The red heartwood is hard, heavy, and close grained but warps so severely in drying that it finds little use except as fuel. In addition, nearly all of the trees over 3 or 5 dm. in diameter are hollow. For this reason, the native green parrots select this species for a nesting place.

PLATE - 2/3 natural size.



SAPINDACEAE

Matayba domingensis (DC.) Radlk.

Negra lora

The negra lora is restricted to Puerto Rico, Cuba, and Hispaniola. Scattered individuals are found through the mountain forests of the island above 300 meters elevation.

It is a medium-sized tree, growing to 20 meters in height and 5 dm. in diameter. Young twigs are slender and minutely hairy but soon become glabrous. The smooth bark is grayish in color and often spotted with an orange red lichen which apparently grows most commonly on this species.

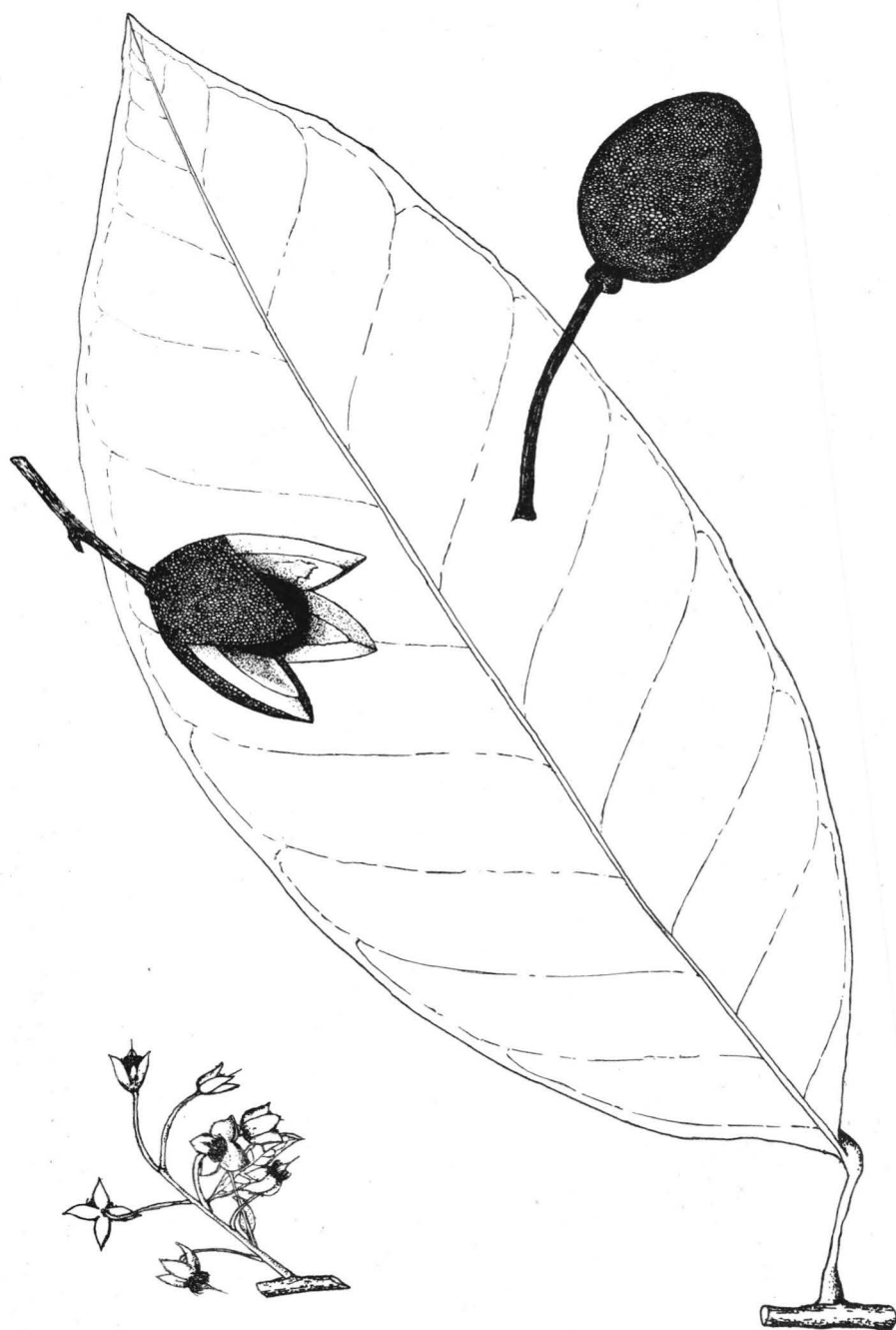
The evenly pinnate leaves are alternate or opposite, with two to eight mostly opposite, entire, obovate leaflets, 4 to 8 cm. in length. These are glabrous, pellucid-punctate, short-stalked, and have a rounded apex.

The small, inconspicuous flowers are borne in lateral panicles.

The fruit is a flat, heart-shaped, 2-lobed, woody capsule about 1 cm. long, and dark brownish red in color at maturity.

The reddish wood is hard, heavy, and strong and finds local use in construction.

PLATE - 2/3 natural size.



ELAEocarpaceae

Sloanea Berteriana Choisy

Cacao motillo, motillo

This species is restricted to Puerto Rico, Hispaniola, and Guadeloupe. In Puerto Rico it is restricted to a belt of mountain forest between 300 and 800 meters above sea-level, but it is quite common within this range, especially in moist ravines.

It is a large evergreen tree, growing to 30 meters in height and 1 meter in diameter. The bark is smooth, usually dark gray in color, but sometimes nearly black. The trunk is always braced at the base with thin plank buttresses, which on large trees may extend to 3 meters or more in height.

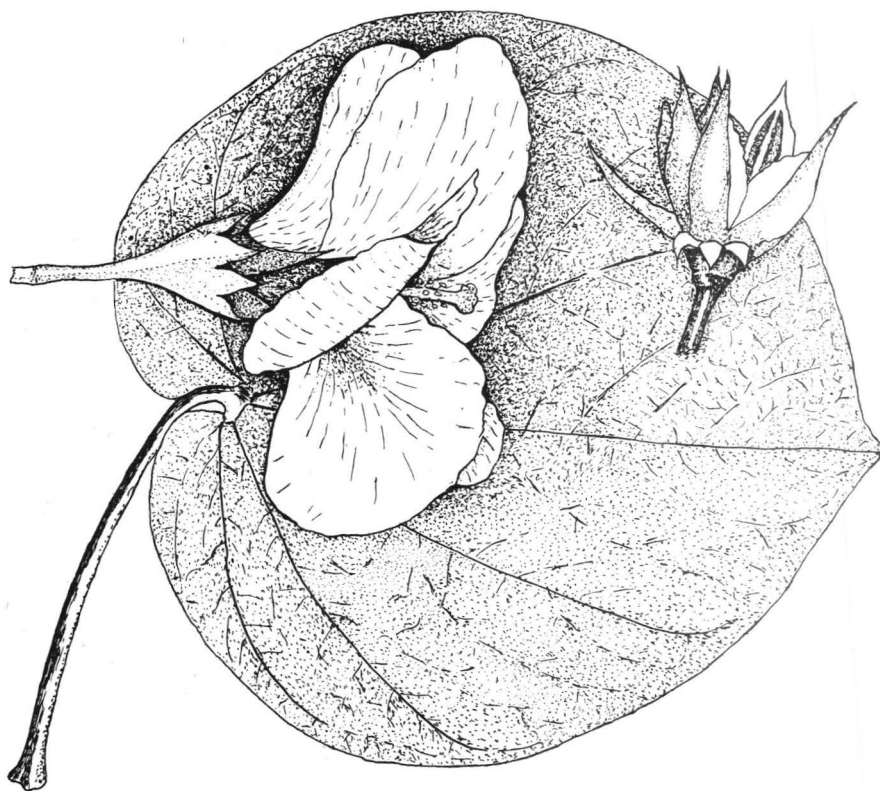
The large, simple, alternate leaves are entire, although those of seedlings are serrate. They are elliptic or ovate-elliptic, ranging to 2.5 dm. long, acuminate or obtuse at the apex, obtuse or rounded at the base, and somewhat leathery in texture. The petioles are 2 to 9 cm. in length and swollen at both ends.

The inflorescence, consisting of a few small flowers, is axillary. Petals are absent but the four sepals are petal-like and yellow in color with a touch of rose on the inner side. The stamens are numerous.

The fruits are brown, ovoid, rounded capsules splitting by 4 valves to release the globular or elliptical seeds each about 1 to 1.5 cm. in diameter.

The nearly white wood is very hard, heavy, strong, and durable. It finds use in local construction and for railway ties.

PLATE - 2/3 natural size.



MALVACEAE

Pariti tiliaceum (L.) St. Hil.

Ema jagua

This species has a wide distribution, occurring in Florida, the West Indies, continental tropical America and the Old World tropics. It is common on the island in moist regions at middle and high elevations, but also grows at low elevations on swampy sites.

Although often shrub-like, it may grow to 18 meters in height, with a diameter of 3 to 4 dm. The trunk is usually short and thick, and widely branched, forming a dense crown.

The large, alternate leaves, ranging to 2 dm. in length, are heart-shaped at the base and have long petioles. The leaves are velvety when young and whitish beneath.

The trumpet-shaped flowers, about 7 cm. in diameter, are very showy. Newly opened flowers are bright yellow, changing later to an orange red.

The fruit is a 5-celled, hairy, gray-green capsule, about 2 cm. in diameter. It opens on maturity to release numerous small, brownish-black seeds.

The wood is purplish in color, somewhat variegated, and lustrous. It is light and soft, firm, durable, easy to work, and takes a high polish. Charcoal from this wood was formerly used for cleaning teeth. From the inner bark a tough fiber is obtained which is used for the making of ropes and cordage.

The tree is easily propagated by cuttings, and it is often found in fence rows where it was started as a live fence post.

PLATE - 2/3 natural size.



MALVACEAE

Thespesia populnea (L.) Soland

Emajagüilla, Santa María, Palo
de jaqueca, Bendy tree, Cork
tree, Otaheite

Emajagüilla has an extensive natural range, being found in Florida, throughout the West Indies, in continental tropical America and in the Old World tropics. It occurs naturally in coastal woods and along the borders of mangrove swamps, but is often planted along roads and about houses for ornament and shade.

It sometimes reaches a height of 20 meters and a diameter of 6 dm. but is usually smaller and often a shrub. The outer bark is gray and shallowly fissured; the inner bark fibrous.

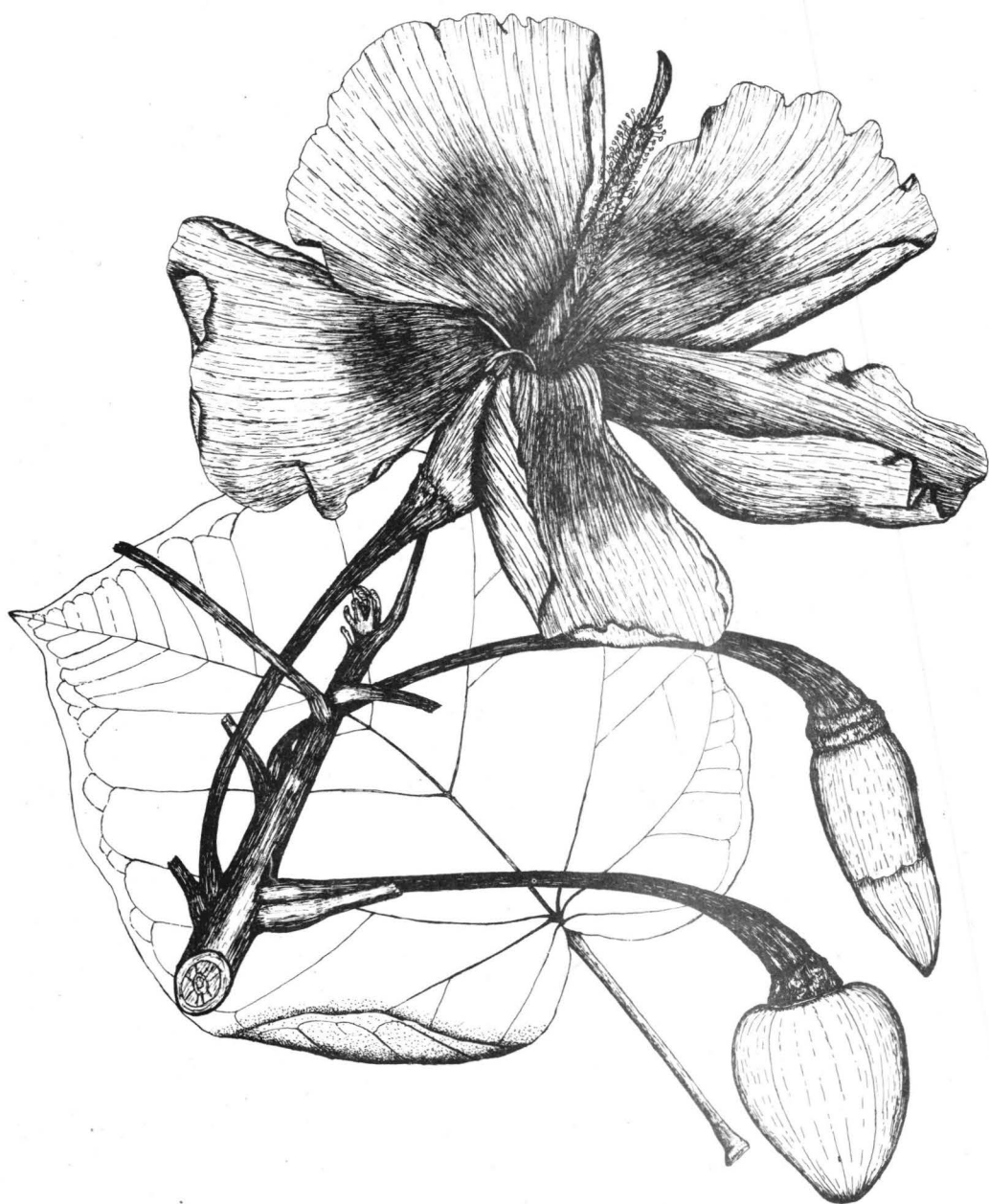
The leaves of this dense-crowned, evergreen tree are long-petioled, entire, heart-shaped, firm in texture, shining, and nearly glabrous. They vary in length from 5 to 12 cm.

The axillary flowers, about 6 cm. long, are yellow in color with a purple base. The entire flower changes to purple with age.

The fruit is a depressed, leathery capsule, 3 to 4.5 cm. broad. It is indehiscent and persists for a considerable time.

The wood is of a dark-brown or reddish-brown color, somewhat variegated, rather hard and strong, durable, easily-worked, and it takes a high polish. The tree is little used for timber in Puerto Rico, but in the Orient is used for furniture and cabinet-work, musical instruments, boats, and vehicles. The inner bark of the branches and young stems yields a tough fiber which is used for cordage. The tree is also used in local remedies. In Venezuela, a decoction of the roots and seeds is used to combat skin diseases, and the seeds furnish a yellow dye.

PLATE - 1/2 natural size.



MALVACEAE

Montezuma speciosissima Sessé & Moc.

Maga, Maga colorada

In spite of the suggestion in the generic name, maga is native only to Puerto Rico. The original specimens were confused with collections from Mexico, resulting in the generic name Montezuma and early records of its occurrence in that country. Although originally confined to the western and central portions of the island, it has been widely planted along roadsides for its excellent shade and showy flowers, and in forest plantations for its timber.

It is an evergreen tree, attaining a height of 20 meters and a diameter of 6 dm. The twigs are stout and the thick, gray bark is deeply fissured on older trees.

The long-petioled leaves are usually heart-shaped, from 5 to 20 cm. long, and 5- to 7-nerved.

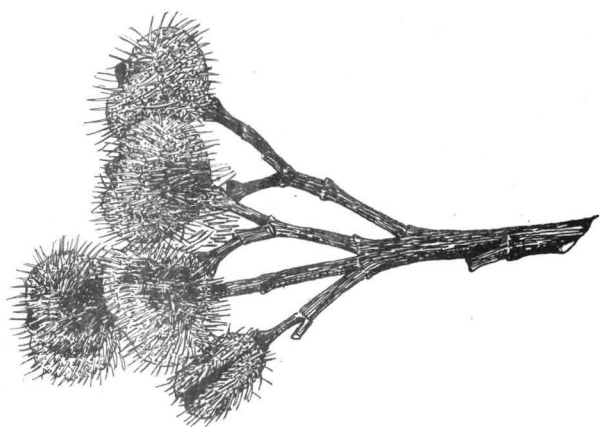
The flowers are 2 to 4 dm. wide. The petals are a deep rose color, shading to crimson within, with 5 double rows of bright yellow anthers.

The fruit is smooth, sub-globose, and 3 to 5 cm. in diameter, containing few to several brown, obovoid seeds. The latter average about 1500 per pound.

The wood is of a rich chocolate brown color, rather hard and heavy, and very durable. It is used for furniture, interior house work, musical instruments, posts, and piles. Furniture made of this wood has the appearance of old mahogany.

The seed germinates readily in about one week, but must be planted soon after collection because of rapid loss in viability. Forest plantations of this species in the Luquillo Mountains have been attacked by field mice, which cut through the stems of seedlings and eat the pith. The largest individuals in a small plantation near Río Grande attained heights of 9 meters and diameters of 9 cm. in five years. Growth on rich soils or with cultivated garden crops is much more rapid.

PLATE - 2/3 natural size.



BIXACEAE

Bixa Orellana L.

Achiote, Annato

The achiote occurs in Jamaica, Hispaniola, Puerto Rico, the Windward Islands, and continental tropical America. In addition, it has been naturalized in many tropical countries in Africa and the Orient. It is found in woods and on hillsides at lower elevations in the island and is often planted about houses.

It is a shrub or small tree, usually less than 4 meters tall, but occasionally reaching a height of 9 meters and a diameter of 3 dm. The twigs are usually scaly.

The simple, alternate leaves are ovate in shape, 8-20 cms. long, 4-15 cms. broad, usually heart-shaped and with long petioles. The leaves and roots are used in South America and Asia as a digestive tonic.

The white to pinkish flowers, borne in terminal panicles, are very attractive. The five petals range from 1.5 to 2.5 cms. in length.

The fruit is an ovoid, two-valved capsule, 3 to 4 cms. long usually densely clothed with long, slender, soft prickles. They are green when young, but turn brownish red with age.

Each fruit contains numerous angular, orange-red seeds about 5 mm. in length. The seeds furnish a useful dye which is obtained by stirring them in cold water. This dye was once used by the natives on their bodies in part for decorative purposes and partly to prevent insect bites. Its most frequent use now is for coloring rice for the table. It is also used to dye foodstuffs, cosmetics, oils, varnishes, and formerly wool and silk.

The wood is pinkish yellow, porous, and soft and has little use. A gum similar to gum arabic is obtained from the branches.

PLATE - 2/3 natural size.



COCHLOSPERMACEAE

Cochlospermum vitifolium (Willd.) Spreng.

Rosa Imperial

This species, a native of continental tropical America, is commonly planted in Puerto Rico and other tropical countries for ornament.

It is a deciduous shrub or small tree, 5 to 12 meters high. The bark is smooth, grayish in color, and the crown develops few branches with thick branchlets.

The long stemmed, alternate leaves, are almost glabrous, heart-shaped at the base, and deeply five-lobed, the lobes being toothed.

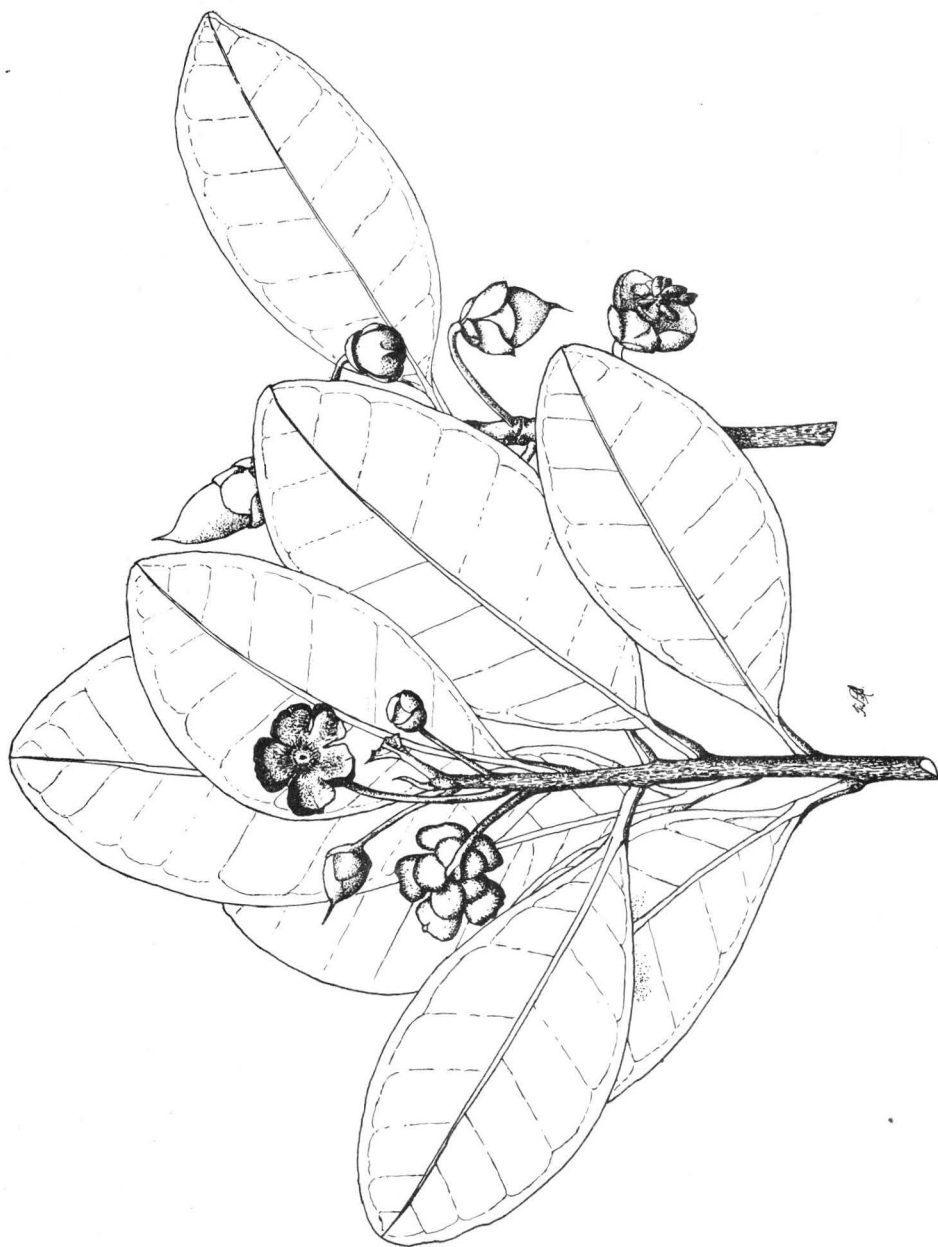
When the tree loses its leaves during the dry season, it becomes covered with very showy, beautiful flowers, which look like large, yellow roses. They are arranged in terminal clusters and are about 10 cm. broad. In its natural range, the flowers have five petals and numerous stamens, but all those trees observed in the island were found to produce double flowers with numerous petals.

The fruit is an obovoid, hairy, 5-valvate capsule, but these have not been seen in Puerto Rico, the flowers dropping to the ground without production of fruit or seeds. The numerous seeds are kidney-shaped and covered with long hairs resembling cotton fibers, which are suitable for stuffing pillows.

The wood is soft and spongy and of no use. The bark contains a tough fiber. Pittier reports that if a hole is made in the trunk and filled with water, a liquid is obtained after a few hours that is considered an excellent remedy for jaundice.

The tree is easily propagated by cuttings and grows best on dry sites.

PLATE - 2/3 natural size.



THEACEAE

Taonabo luquillensis (Krug & Urban) Britton

This species is endemic to Puerto Rico and found only at middle elevations in the Luquillo Mountains. Scattered individuals are found mostly on the western and northern slopes of the range.

It is a medium-sized evergreen tree growing to 20 meters in height and 3 dm. in diameter. It is erect, narrow-crowned and densely leafy. The bark is nearly smooth and dark gray in color.

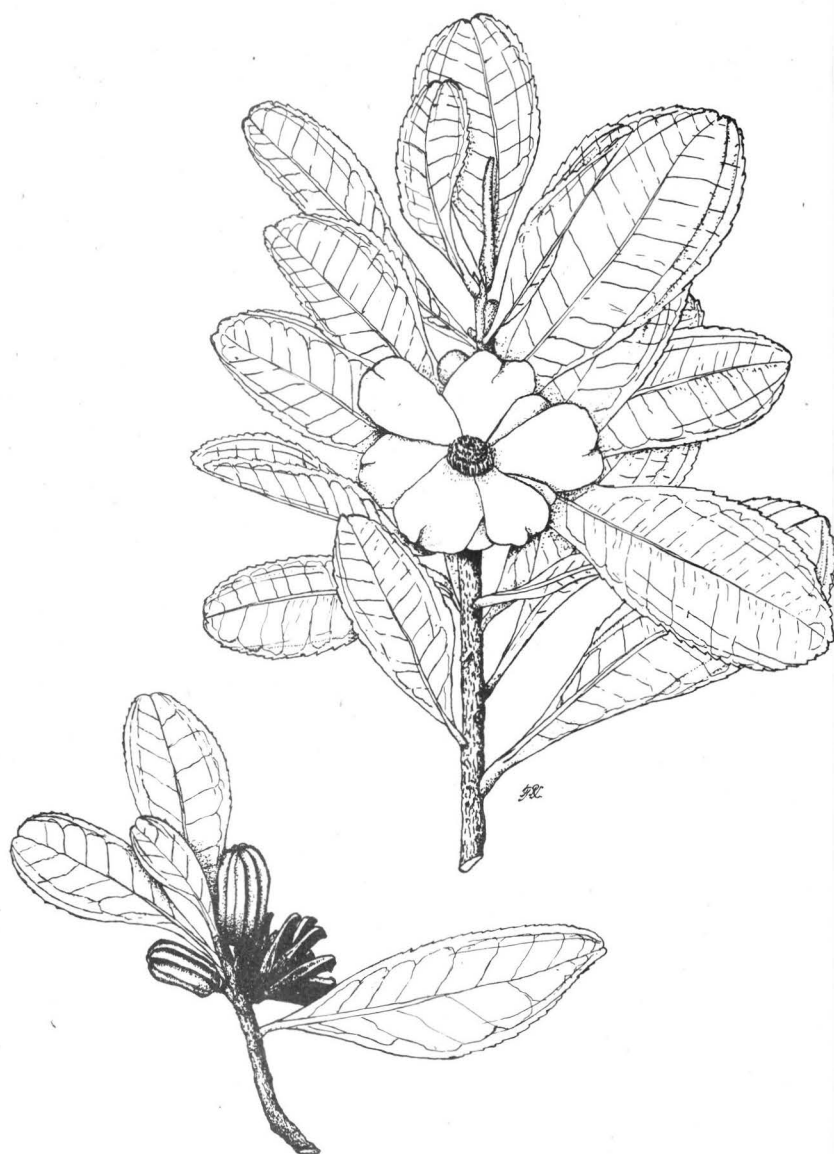
The alternate, simple, entire leaves are variable in shape, from oblong to elliptic-oblong, leathery, 6 to 12 cm. long, acute or obtuse at the apex and narrowed at the base. The petioles are stout.

The axillary flowers are borne singly on long slender peduncles 3 to 9 cm. long. The peduncles as well as the flowers are white or creamy colored. The 5 sepals are of two sizes, the inner about 1 cm. in diameter. The 5 petals are obcordate, about 12 mm. in length and partly united at their bases. The stamens are numerous and attached to the base of the petals. The flowers are very fragrant and are borne in profusion.

The fruit is an ovoid, pointed-tipped capsule 1 to 2 cm. in length which ruptures irregularly, disclosing several small, bright red seeds attached to the central axis.

The characteristics and uses of the wood are not known.

PLATE - 2/3 natural size.



THEACEAE

Haemocharis portoricensis Krug & Urban

Maricao verde, Maricao

This species is restricted to the eastern mountains of Puerto Rico above 300 meters in elevation.

It is a medium-sized, deciduous tree, growing to 20 meters in height and 1 meter in diameter. The bark on older specimens is gray and fissured.

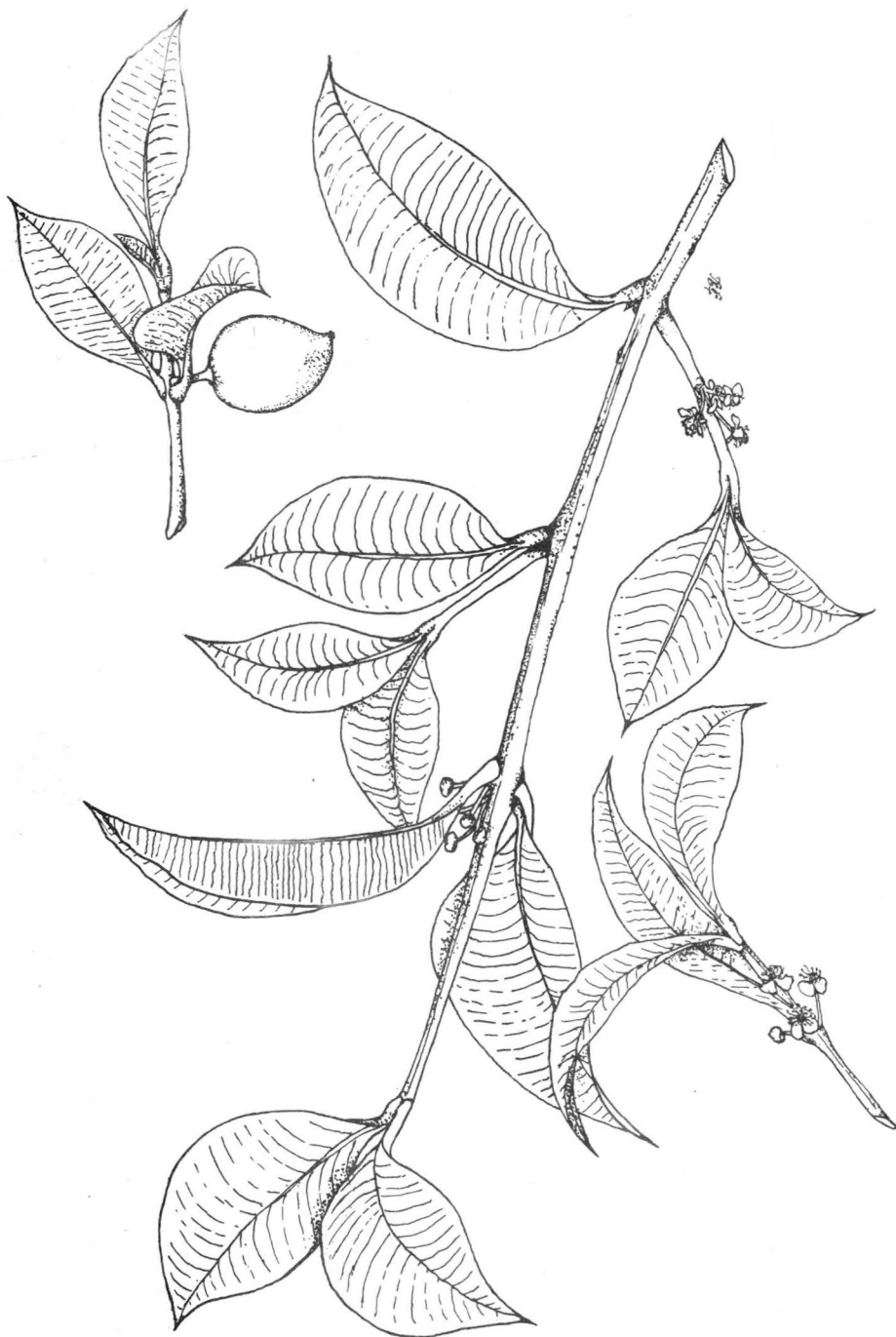
The simple, alternate, papery leaves have very short petioles, and are elliptic to elliptic-obovate in shape, 5 to 12 cm. long, with crenate-serrate edges, especially so above the middle. New leaves are orange red in color, but soon turn dark green. A very distinct leaf characteristic is the lines on the lower surface parallel to the mid-vein.

The bright white fragrant flowers with petals about 2 cm. long are very attractive against the dark foliage. The stamens are numerous.

The fruit is an oval 6- to 10-ridged capsule from 2 to 2.5 cm. in length. The dry capsules persist on the tree after opening and serve as an aid in identification during the period when the leaves have been shed.

Little is known of the wood and its uses, but natives report that it is a "good" wood.

PLATE - 2/3 natural size.



CLUSIACEAE

Rheedia acuminata (Spreng.) Tr. & Pl.

Palo de cruz, Guayabacoa,
Sebucán

This tree, found in several places in Puerto Rico and in Vieques, does not occur outside of these two islands. It is found along the northern and eastern coasts, near Coamo, and in both the Naguabo and Luquillo mountains.

It is usually a small evergreen tree, growing to 20 meters in height. The twigs are angled and flattened; the bark dark gray. The branches growing at right angles to the straight stem are typical and have given rise to the common name Palo de cruz.

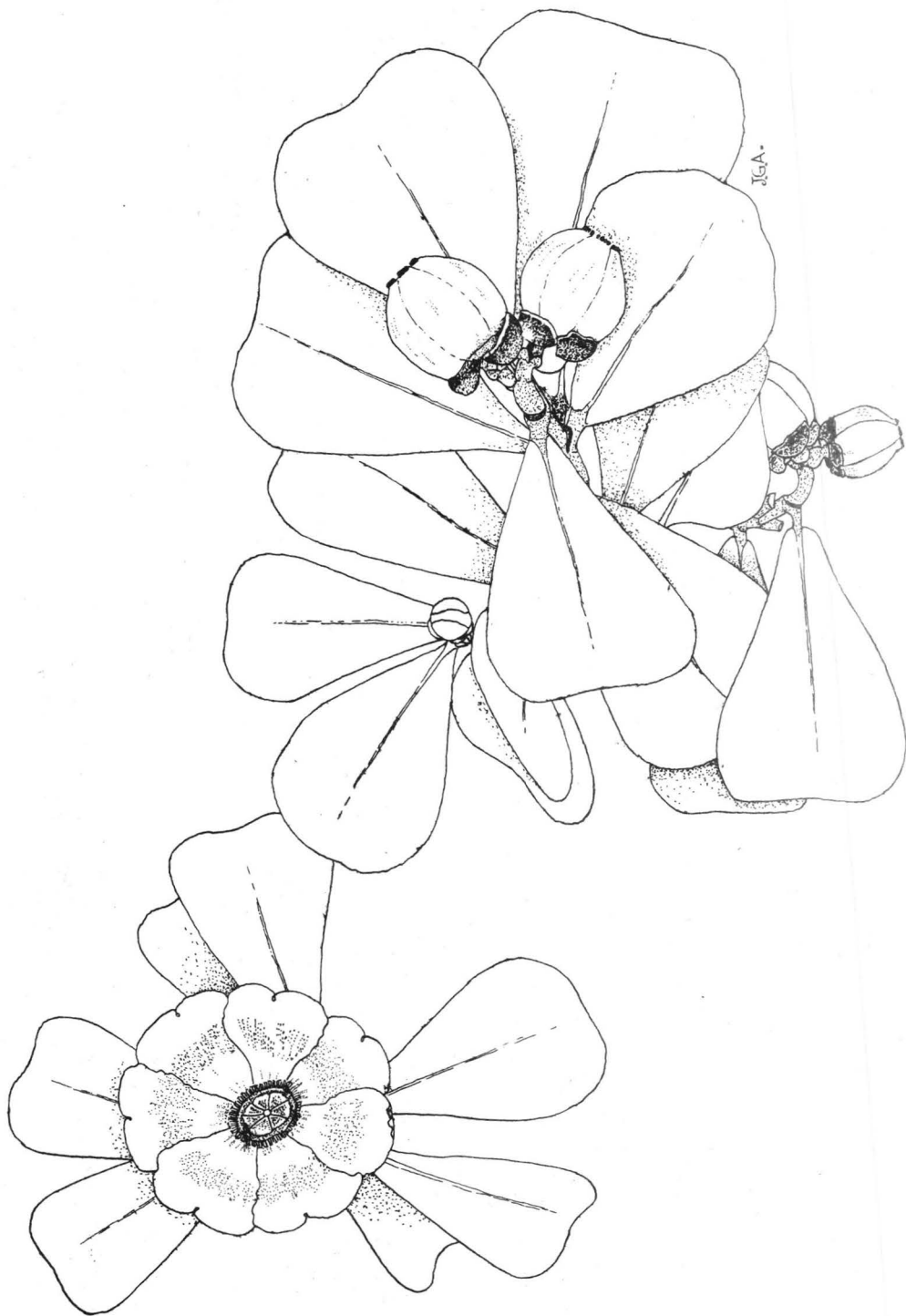
The leaves are very distinct and definitely identify the tree. They are simple, entire, opposite, rigidly leathery, elliptic to elliptic-obovate, 5 to 9 cm. long with the acute tips terminating in a rigid needle-like point. When broken, the leaves, as well as other parts of the tree exude a bright yellow sap.

The flowers, clustered or solitary in the axils of the leaves, are small and inconspicuous. The petals are pink, about 6 to 7 mm. long. The male flowers have about 18 stamens, the female flowers fewer.

The fruit is an obovoid or ellipsoid berry 2.5 to 3.5 cm. long which is bright yellow in color at maturity.

The wood is hard and heavy but finds little use because of its small dimensions and scarcity.

PLATE - 2/3 natural size.



CLUSIACEAE

Clusia rosea Jacq.

Cupey, Pitch apple, Balsam fig,
Scotchman tree.

This species, found in the West Indies and in continental tropical America, is common throughout the island, mostly at low elevations.

It is a medium-sized, evergreen tree, attaining a height of 20 meters and a diameter of 6 dm. It is interesting because of its curious habit of growth, the seed often germinating in the forks of trees and sending long aerial roots to the ground. These eventually encircle and kill the supporting tree. The bark is fairly smooth, grayish in color, and like the leaves, contains a light yellow sticky sap.

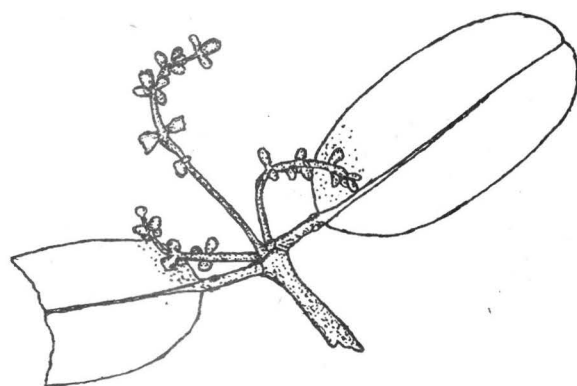
The opposite, simple, entire leaves are thick and stiffly leathery, 10 to 15 cm. long and 7 to 12 cm. wide beyond the middle. They are rounded at the apex, narrowed at the base with stout petioles about 1 cm. long. Similar to the "uva del mar" leaves, Oviedo reports that in the early days, the Spaniards used the thick, heavy leaves as a substitute for writing paper and also, they made playing cards from them when pasteboard cards could not be secured.

The attractive flowers are solitary or sometimes paired, and may be 7 cm. in diameter. The white or rose-colored petals are broadly obovate or nearly orbicular.

The fruit is whitish-green, ranging to 7 cm. in diameter, and more or less rounded. It splits at maturity into several sections which remain attached at the base, releasing several small seeds from each section.

The reddish-brown wood is hard, heavy, strong, and durable, being employed as fence posts, ties, fuel and in general construction. The yellow resin from the trunk and other parts of the tree is used in Venezuela for curing bone fractures and dislocations.

PLATE - 2/3 natural size.



TERMINALIACEAE

Laguncularia racemosa (L.) Gaertn.

Mangle blanco, White mangrove, Mangle bobo.

This tree is found in Florida, the West Indies, continental tropical America, and west tropical Africa. It grows in tidal swamps along the coast and about the lagoons of Puerto Rico.

It reaches a maximum height of 20 meters and a trunk diameter of 8 dm., although usually smaller. In Puerto Rico no large specimens can be found at the present time. The reddish brown, glabrous twigs are thickened at the nodes.

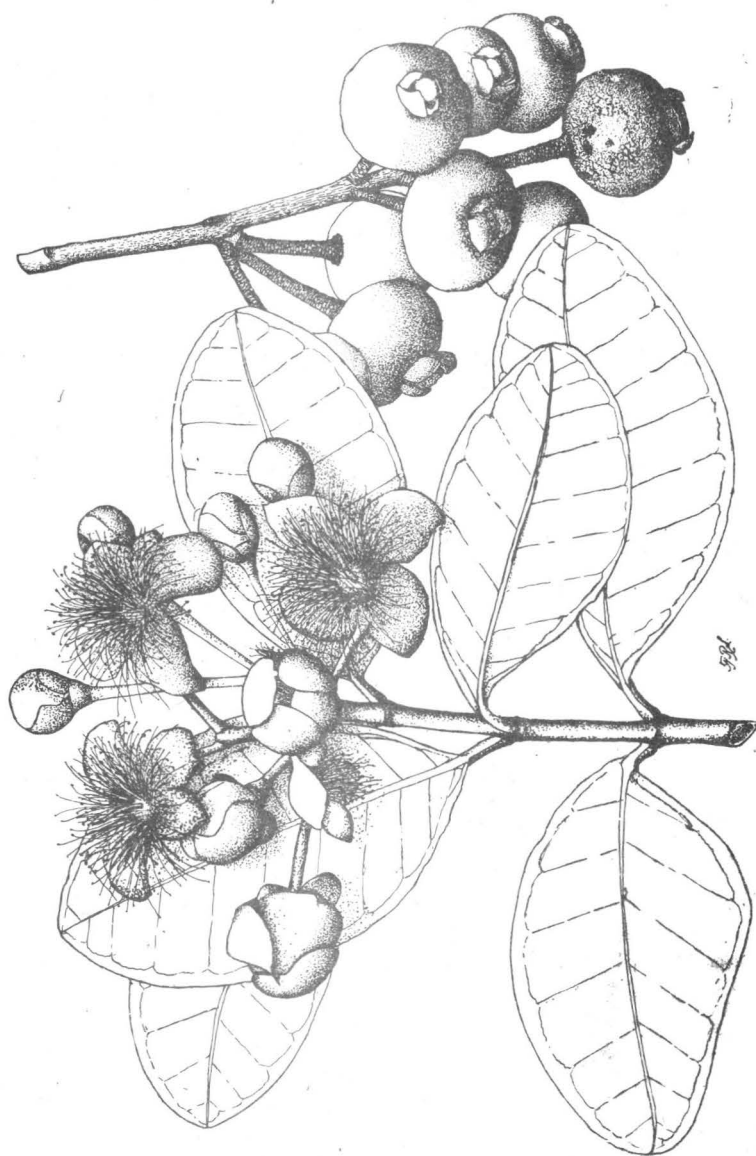
The opposite leaves are oblong and range in length from 2 to 7 cm. They are rounded or notched at the apex and bear two conspicuous glands on the petiole where it joins the blade.

The small flowers are arranged in few-to many-flowered racemes. The petals are minute and soon drop off. Plantation trees less than two years old were seen flowering and fruiting in the San Juan district.

The fruit is an oblong to obovoid, reddish drupe, 1.5 to 2 cm. long, covered with a grayish pubescence. These float readily on the water, and therefore provide wide distribution.

The yellowish-brown wood is hard, strong, and heavy and is of value for construction purposes. On the island, it is used mostly for fuel and charcoal, but it is sometimes employed for tool handles and other purposes in the round. The bark is rich in tannin and as a result it is occasionally used for tanning or medicinal purposes.

PLATE - natural size.



MYRTACEAE

Eugenia Stahlia (Kiaersk.) Krug.

Guayabota

This species, endemic to Puerto Rico, is found only in mountain forests at middle and higher elevations.

It is a medium sized, narrow-crowned, evergreen tree, growing to 20 meters in height and 7 dm. in diameter. The twigs are rather stout, and the bark is light gray or sometimes nearly white, scaling off in plates.

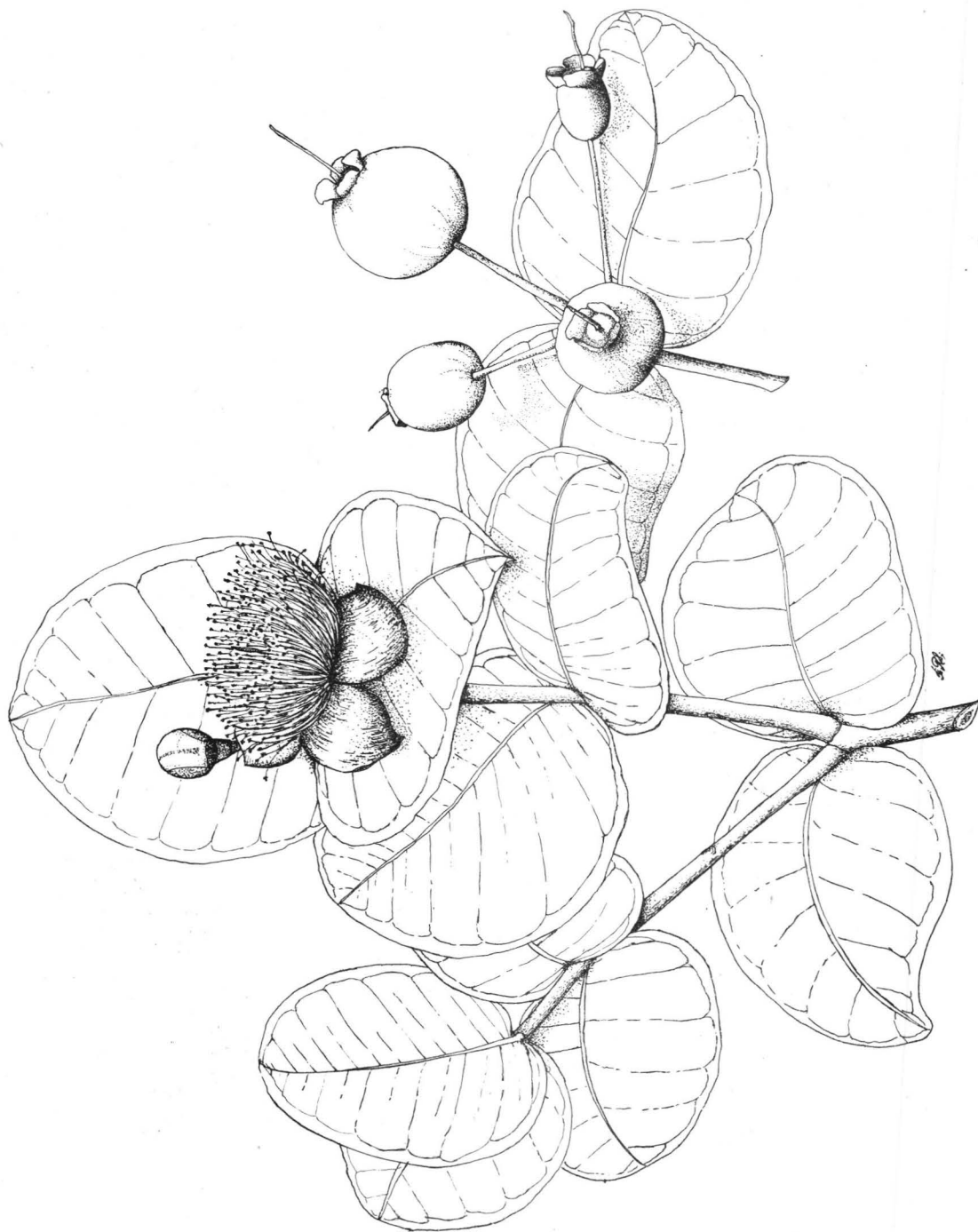
The simple, opposite, entire leaves are leathery, elliptic to elliptic-obovate in shape, 5 to 10 cm. long, the apices being rounded or obtuse, and the bases narrowed. The stout petioles are 5 to 7 mm. long. When crushed the leaves give off a pleasant aromatic odor and are pellucid-punctate as is seen by holding them against the light.

The flowers are borne singly or in clusters. They have white, nearly round petals, 10 to 15 mm. long, and numerous stamens.

The rough, nearly globose fruits are about 2 cm. in diameter at maturity. The sepals persist on the top of the fruit.

The wood is light colored, heavy, hard, strong, and durable. It is valued for ox-cart tongues or railway ties and finds ready use for general construction purposes.

PLATE - 2/3 natural size.



MYRTACEAE

Eugenia borinquensis Britton

Guayabota de sierra,
Guayabota

This is an endemic species found only at higher elevations in the eastern mountains of Puerto Rico.

It is a small, evergreen tree, growing to 10 meters in height, or sometimes shrubby. It is glabrous throughout, having smooth gray bark and rather stout rigid twigs.

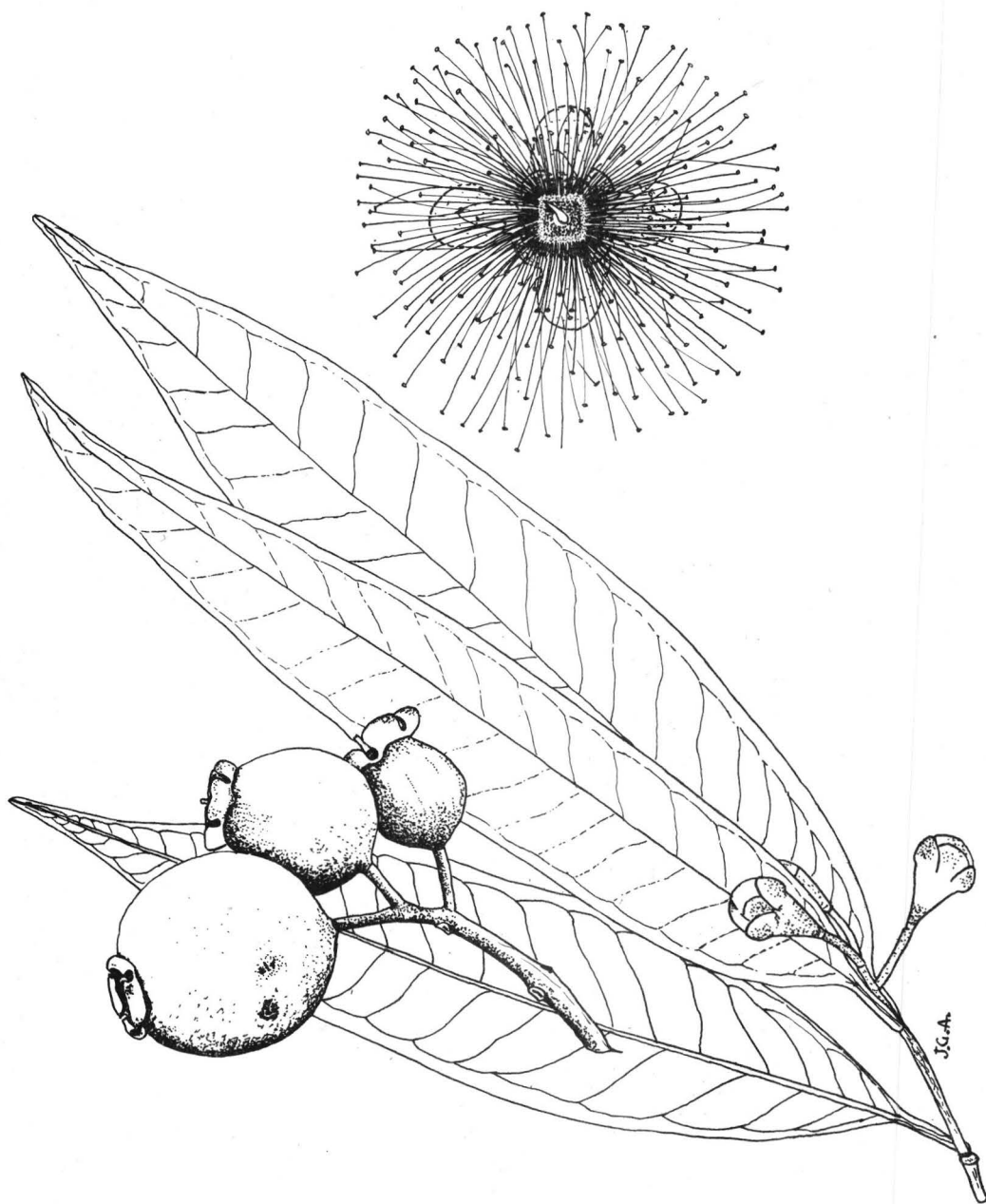
The simple, opposite, entire leaves are nearly circular, 5 to 10 cm. broad, stiff, leathery, and somewhat heart-shaped at the base with stout petioles only 1 or 2 mm. long. They are strongly veined, pellucid-punctate, and light green in color.

The flowers, few or solitary in the axils of the leaves, have short calyx lobes, white purplish-mottled obovate petals, very numerous stamens, and are about 15 mm. long.

The fruit is an oval or nearly round reddish-green berry about 2 cm. in diameter at maturity.

The wood is heavy, hard, and durable, but is used very little because of the small size of the tree and its occurrence in rather inaccessible places.

PLATE - 2/3 natural size.



MYRTACEAE

Jambosa Jambos (L.) Millsp.

Pomarroza, Rose apple,
Malabar plum

This tree, native to India and Malaya, has become naturalized throughout the West Indies and continental tropical America. In Puerto Rico it is widely distributed through the mountains and appears as a part of the native flora. In mountain pastures it thrives and spreads like a weed, sometimes forming dense, pure stands over considerable areas and shutting out practically all other vegetation.

It is a medium-sized, evergreen tree with a dense crown of deep green foliage. It attains a height of about 10 meters and is glabrous throughout. The smooth bark is dark brown.

The lanceolate, almost leathery leaves are from 10 to 20 cm. long. They are naturally dark green, but are often covered with a black mildew giving the foliage a very dark appearance.

The few large flowers, borne at the ends of the branchlets, are handsome and conspicuous because of their dense clusters of yellowish white stamens which are 3 to 4 cm. in length.

The fragrant, yellowish or pinkish-white fruit, globose, 3 to 4 cm. in diameter, has a crisp hard flesh and a large central cavity usually containing one large seed. Although not sold in the market, the fruit is rather pleasant to the taste with a sweetish rose-water flavor. The flesh contains very little juice.

The seeds germinate soon after falling and the tree reproduces itself readily, especially in moist and shady sites.

The wood, hard and heavy, is used to some extent for fence-posts and is a good fuel and charcoal wood for which it is mainly used on the island.

PLATE - 2/3 natural size.



RHIZOPHORACEAE

Rhizophora Mangle L.

Mangle colorado, Red mangrove,
Zapatero, Chifle de vaca

The red mangrove occurs throughout the West Indies, in Florida, continental tropical America and in tropical Africa. It is confined to tidal or mangrove swamps along the coast. All the large individuals of this species in Puerto Rico have been felled.

It reaches a height of 30 meters and a diameter of 9 dm. The most striking characteristic of the tree is the mass of stilt-like aerial roots which support the trunk often up to 10 feet above the ground, and sometimes occupying an area up to 10 meters in diameter around the trunk.

The smooth, leathery, entire leaves are dark green in color, elliptic to elliptic-obovate, bluntly pointed at the apex, and from 5 to 15 cm. long. They are opposite and have a prominent midrib.

The flowers are borne in few-flowered clusters and have linear pale yellow petals.

The fruit is corky and only 2 or 3 cm. in length, but germination takes place while it is still pendent from the branches, and a pointed radicle grows to about 3 dm. in length. When this finally drops, it drives its point into the mud and takes root, or if it falls in the water, it floats upright until it encounters some muddy bank where it can establish itself. The species may be regenerated by pushing the fruits a few inches into the mud.

The dull brown or reddish brown wood is very hard and heavy and fine grained. It is used for boat-building, tool handles, general construction, and is excellent for fuel or charcoal. The rough gray bark contains 20 to 30 per cent of tannin. In Puerto Rico, fishermen dye their lines with a solution from the roots.

PLATE - natural size.



ARALIACEAE

Didymopanax Morototoni (Aubl.) Dcne.

Yagrumo macho, Jereton

Outside of Puerto Rico this species is native to Cuba,, Hispaniola, Guadeloupe, Trinidad, northern South America, Panama, and Costa Rica. Here it occurs at low and middle elevations in wet regions. The bark is light-colored and smooth, with large persistent leaf-scars.

It is a striking evergreen tree of few branches attaining a height of 30 meters and a diameter of 6 dm. or more.

The large, palmately compound leaves, clustered at the ends of the stout branches, consist of 7 to 10 stalked drooping leaflets at the end of a main leaf-stalk which is 3 to 12 dm. in length. The under side of the leaves are golden brown in color, with the exception of those of young seedlings. The latter are distinct also in being serrate. The leaflets are oblong or obovate, entire, long-pointed, and from 2 to 4 dm. in length.

Individual flowers are small but they occur in umbels in large compound panicles which are quite conspicuous. Each flower has five petals about 2 mm. long.

The fruit is small, slightly fleshy, flat on both sides and contains two brown, half-moon shaped seeds about 1/2 cm. in length.

The wood is light, soft, close-grained, rather brittle, and not durable. It is important because it is one of the few tropical timbers which possess the proper qualities for good match sticks. It is also reported as a satisfactory substitute for pine and spruce for interior construction, boxes, and paper pulp.

PLATE - 2/3 natural size.



ARALIACEAE

Didymopanax Gleasonii Britton & Wilson

Yuquilla

This species is endemic to Puerto Rico. It is a shrub or small tree with clubby twigs which was discovered by botanists for the first time in 1926. It is fairly common on the highest ridges between Guineo Lake and Cerro de la Punta in the central mountains and two individuals have been found at middle elevations of the northern slopes of the Luquillo Mountains south of Río Grande. The larger of these is about 25 feet tall and 10 inches in diameter.

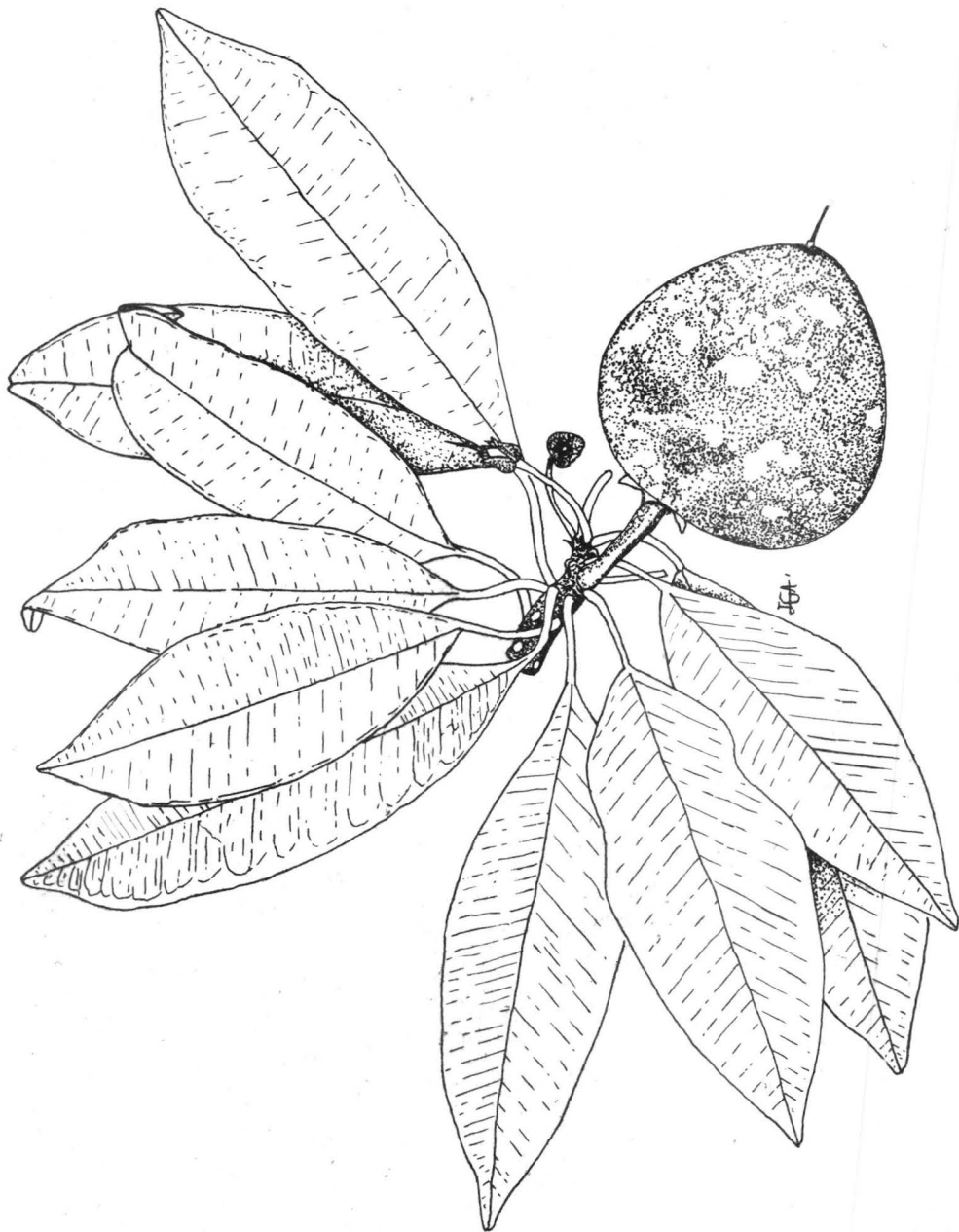
The leaves are very distinct and can hardly be confused with any other species on the island. Their resemblance to the leaves of the tapioca plant, "yuca" has given rise to the common name yuquilla. They are palmately compound with 3 to 8 oblong-obovate leaflets, each 3 to 12 cm. long, grouped on a long slender petiole 5 to 15 cm. long. The leaf tips are notched or rounded.

The five parted flowers occur in panicle umbels at or near the ends of the twigs. They are gray and finely hairy.

The fruits are flattened, about 7 mm. broad, and topped by the two persistent styles.

No use is known for the species. The brittle branches indicate a weak wood.

PLATE - 2/3 natural size.



SAPOTACEAE

Sapota Achras Mill.

Níspero, Sapodilla, Nase berry

The níspero is found in the West Indies and continental tropical America and has been introduced into other tropical regions for its edible fruit. Possibly it is not native to Puerto Rico. On the island it is planted near homes at lower elevations and mostly in the drier sections.

It is a handsome, evergreen tree, growing to about 20 meters in height with a dense rounded crown of dark green leaves. The twigs are rather stout; the bark is dark brown and exudes a white milky sap when cut.

The alternate, glossy, leathery leaves are clustered at the ends of the branchlets. They are elliptical in shape and range in length from 5 to 12 cm.

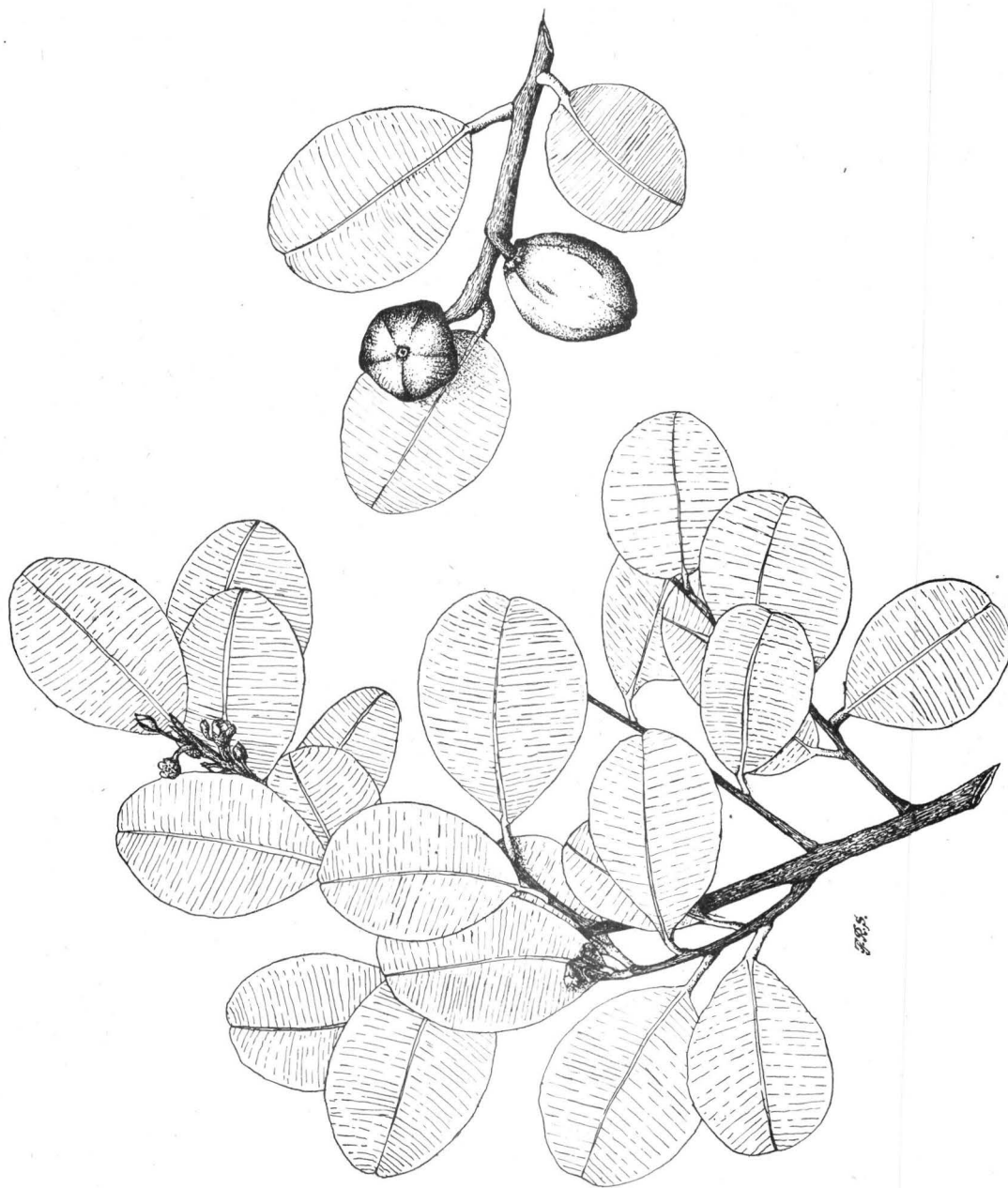
The six-parted white flowers are solitary in the axils on stems about the same length as the petioles.

The fruit is a large, brown, rough-skinned berry, globose or ovoid in shape, 3 to 8 cm. in diameter with a sweet, brownish flesh. Each fruit contains from 1 to 12, black or brown, shiny, flattened seeds about 2 cm. long with a white scar on their inner edges. It is ranked by many among the best of the tropical American fruits.

The dark-reddish heartwood is hard and heavy, fine-textured and durable. It is used in cabinet work, for carts, and for general construction.

The condensed latex is the commercial chicle from which chewing-gum is made. The trees are tapped during the rainy season by making V-shaped gashes in the bark and collecting the milky sap in small receptacles. The water is driven off by heating in shallow kettles and kneading with a stick, after which the chicle is made into small leaves for export. It is said that a tree in its prime will yield more than 20 pounds of gum in a season, but this decreases with repeated tappings. The principal source of supply is southern Mexico.

PLATE - 2/3 natural size.



SAPOTACEAE

Micropholis garcinifolia Pierre

Caimitillo verde, Caimitillo

This species is found only in the eastern mountains of Puerto Rico above elevations of 300 meters, most commonly at high elevations where on the ridges it sometimes comprises a high percentage of the forest stand.

It is a medium sized tree, growing to 20 meters in height and 7 dm. in diameter. It is usually straight-trunked with smooth dark gray bark and plank buttresses at the base. The bark as well as the leaves and immature fruits exudes a milky sap when cut.

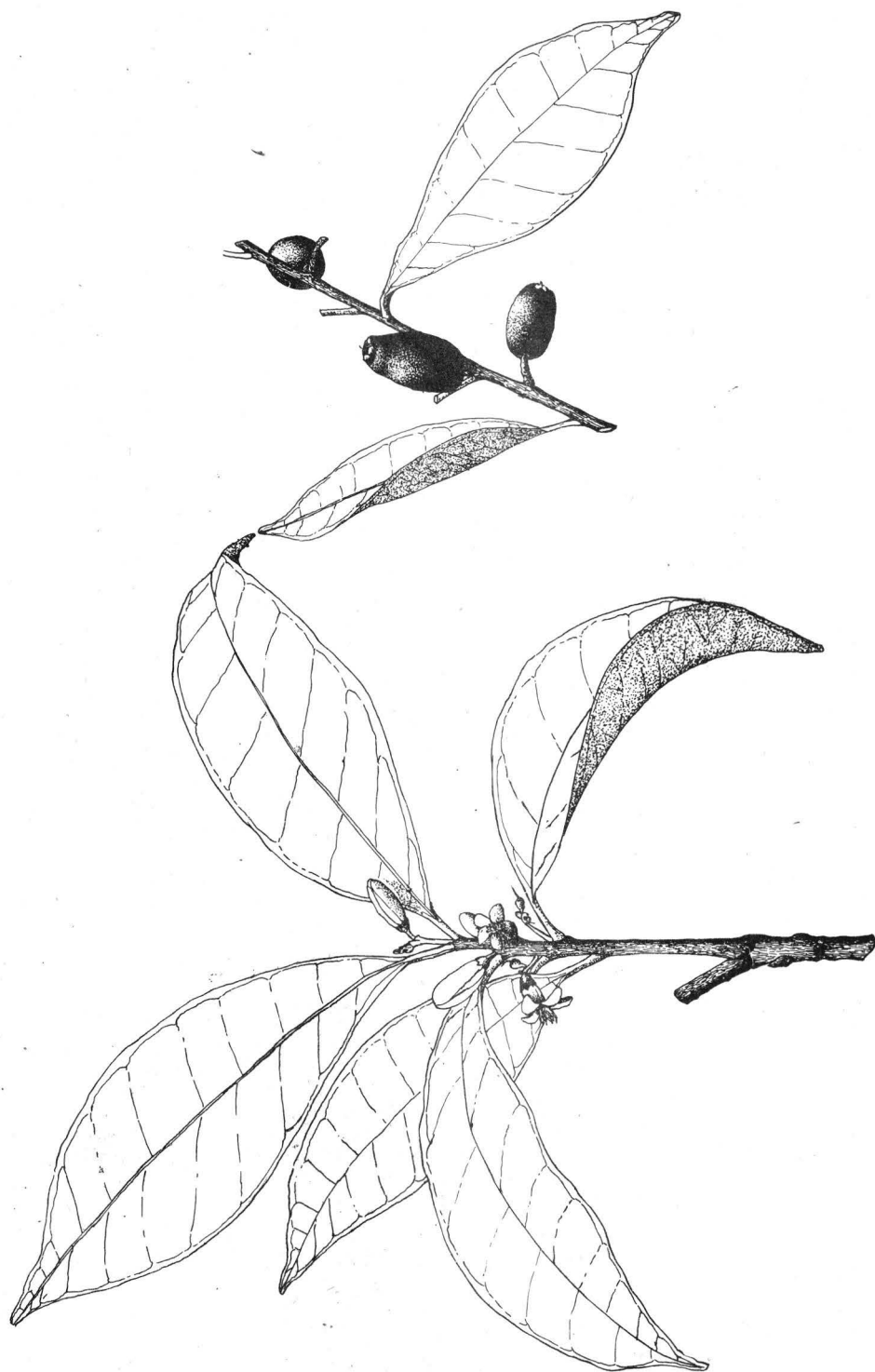
The simple, entire, alternate leaves are leathery, elliptic, or oblong-elliptic, 4 to 8 cm. long, rounded or indented at the tip or sometimes somewhat pointed. They are smooth at maturity, but somewhat silky beneath when young, with stout petioles 3 to 8 mm. long and numerous veinlets at right angles to the midveins which are rather prominent on both surfaces.

The flowers are very small and inconspicuous, occurring singly or in groups of 2 or 3 in the axils of the leaves.

The fruit is an ellipsoid berry, green at maturity, 2.5 to 4 cm. long, containing a few long black seeds about 1.6 cm. in length.

The wood is hard, heavy, and straight-grained and finds use in general construction.

PLATE - 2/3 natural size.



SYMPLOCACEAE

Symplocos martinicensis Jacq.

Aceituna blanca

This species, occurring outside of Puerto Rico in St. Thomas, Tortola, and the Lesser Antilles from Saba to Trinidad, is occasionally found in thickets and on wooded hills in the northern districts of the island.

It is usually a small tree from 5 to 15 meters in height. The bark is smooth and light gray in color.

The simple, alternate, papery, entire leaves are ovate, elliptic or obovate in shape, 6 to 12 cm. long, glabrous, with acuminate apexed and narrowed bases. The petioles range from 7 to 15 mm. in length.

The attractive inflorescence consists of clusters of few to several flowers in the axils of the leaves. The white, fragrant flowers have 5 oblong petals 9 to 15 mm. long which are partly united at the base. The filaments of the stamens are united at their sides.

The fruit is an oblong drupe, 9 to 13 mm. long, bluish black at maturity, containing one oblong seed.

The wood is light in color, hard, moderately heavy and strong. In spite of its good qualities it is used very little because of its scarcity and the small size of the trees.

PLATE - 2/3 natural size.



RAOL

STYRACACEAE

Styrax portoricensis Krug & Urban

This species, endemic to Puerto Rico, is restricted to the lower and middle elevations of the eastern mountains.

It is a small tree, possibly attaining a height of 15 meters, but usually less than 5 meters. The twigs are rather slender and densely short hairy.

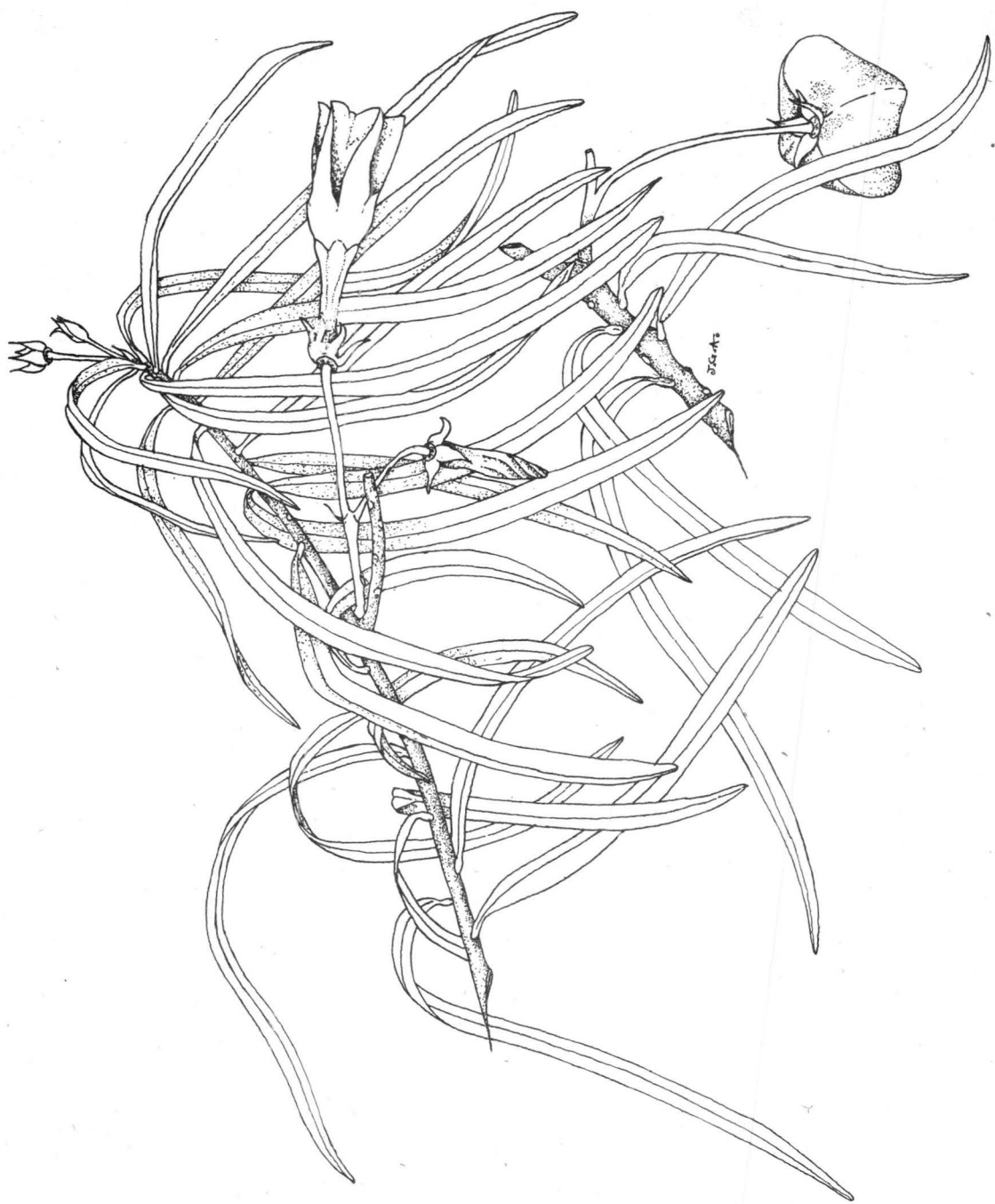
The simple, alternate leaves are entire or very finely toothed, oval to elliptic-obovate, 7 to 12 cm. long, papery, with acute or acuminate apex, narrowed base, and hairy petioles 6 to 10 mm. in length.

The flowers are borne singly or in small clusters in the axils of the leaves. The green sepals are united in a 5-toothed tube. The five petals of the corolla are white and silvery within. The 10 stamens are united in a single circle which distinguishes this from the genus Symplocos with stamens united but in more than one series. The flowers are pleasantly fragrant.

The fruit is green in color, angular, leathery, 2 to 3 cm. long, and has a pointed tip.

Due to its scarcity and small size, the wood is seldom used, and little is known of its qualities.

PLATE - 2/3 natural size.



APOCYNACEAE

Thevetia Peruviana (Pers.) K. Schumann

Cabalonga, Lucky-nut,
Milk tree.

This species is native to Florida, the West Indies, and continental tropical America, and has been introduced into several tropical countries of the eastern hemisphere. It is found in the coastal thickets of the island and occasionally planted in gardens for ornament.

It is a shrub or small tree, growing to 30 feet in height. It is glabrous throughout, the twigs being rather stout and densely leafy. The twigs and leaves exude an abundance of a white milky sap when broken.

The leaves are linear, 7 to 15 cm. long and about 1 cm. wide, narrowed at both ends and nearly sessile. They are bright green and shiny above, rather dull beneath, and they have a prominent midvein.

The flowers, borne in the axils of the leaves and branches, are bell-shaped with five twisted petals, yellow to orange in color, and from 4 to 7 cm. long. They are attractive and sweet-scented.

The fruit is a triangular-compressed drupe about 3 to 4 cm. broad, 2 to 3 cm. long, and about as thick as long. It contains one seed which is sometimes carried about as a good-luck charm. A bright yellow oil is expressed from the seeds which burns well without much smoke, and which has medicinal value.

The milky juice of this tree is extremely poisonous. In Yucatán, cotton soaked in the sap is placed in cavities of the teeth to relieve toothache. The bark, which is a cathartic, is used in the form of the tincture and is said to be a powerful febrifuge. When given in large doses, it is a strong poison, while in smaller amounts it acts as an acrid purgative and emetic.

PLATE - 2/3 natural size.



EHRETIACEAE

Cordia sulcata DC.

Moral, White manjack

This species, also found in Hispaniola, the Virgin Islands, and in the Lesser Antilles from Saba to Trinidad, is common in wet or moist portions of Puerto Rico at all elevations.

It is a medium-sized, deciduous tree, growing to 20 meters in height with stout, finely hairy twigs and light gray, furrowed bark.

The simple, alternate, leaves are very conspicuous, ovate to ovate-elliptic in shape and from 1 to 3 dm. long. They are rough-hairy on both sides, with an acute or acuminate apex, a rounded or partly heart-shaped base and stout hairy petioles 1 to 1.5 cm. long.

The small white sessile flowers are borne in erect many-flowered panicles 8 to 20 cm. across.

The fruits, which are produced in abundance, are small, globose, whitish, translucent drupes 6 to 8 mm. in diameter, each containing a hard woody pit.

The wood is rather light, but is used considerably by the natives for tool handles.

PLATE - 2/3 natural size.



EHRETIACEAE

Cordia borinquensis Urban

Mufieco

This species, found only in Puerto Rico, is common in moist or wet districts at middle and higher elevations.

It is usually a small, deciduous tree, growing to 15 meters in height, often flat-topped with three spreading branches, the lower sets of branches occurring in distinct whorls. The bark is smooth, and grayish.

The simple, alternate, entire, leathery leaves are elliptic, oval or obovate, .8 to 2 dm. long, with an obtuse or rounded apex, obtuse or rounded base, short stout petioles and prominent veins. They turn to a dull yellow color before falling.

The small, white flowers are borne in short-stemmed, several to many-flowered clusters, 4 to 8 cm. broad. The calyx is smooth and 5-pointed; the petals are united into a tube with 5 lobes.

The fruit is an ovoid to globose drupe about 7 mm. long which turns red at maturity.

The wood is yellowish and rather hard and heavy but finds little use except for firewood and tool handles.

PLATE - 2/3 natural size.



VERBENACEAE

Vitex divaricata Sw.

Higüerillo, Péndula

Higüerillo is widely distributed through both moist and dry districts of the island at all elevations and is also found in Cuba and the Windward Islands.

It is a medium-sized, deciduous tree attaining a height of 20 meters, and a diameter of 8 dm. The light-colored bark separates in strips on the older trees.

The slender petioled leaves are usually tri-foliate, or some of them, especially on younger trees, are simple. The thin, entire leaflets are elliptic to ovate in shape, 5 to 15 cm. long, with a pointed apex and a narrow or rounded base.

The attractive bluish flowers are borne in many-flowered axillary panicles. The petals are united into a tube 5 or 6 mm. long and about as broad.

The fruit is a smooth, black drupe, oval in shape, and 8 to 10 mm. long. The seeds number about 8,000 per pound.

Reforestation with this species is being carried on in Puerto Rico and Trinidad. The tree is easily propagated by seed although germination, which takes about 20 days, is rather low. The island plantations are still very young but show good survival and growth.

The nearly white wood is very hard and durable, and is used in construction and cabinet work. In the central part of the island, the framework of many of the older houses and fence posts are made from wood of this species.

PLATE - 2/3 natural size.



BIGNONIACEAE

Crescentia Cujete L.

Higüero, Calabash tree

This tree, found in Florida, throughout the West Indies, and in continental tropical America, is frequently seen near country homes, most commonly in the drier sections of Puerto Rico where it may be found scattered through pastures.

It is usually a small tree with long spreading branches, less than 10 meters in height, and with diameters up to 2 dm.

The simple, entire, spatulate, persistent leaves are arranged in tufts of up to 10. They are extremely variable in size, ranging to 2 dm. in length and .5 dm. in width. They are short pointed at the apex and narrowed to the nearly sessile base.

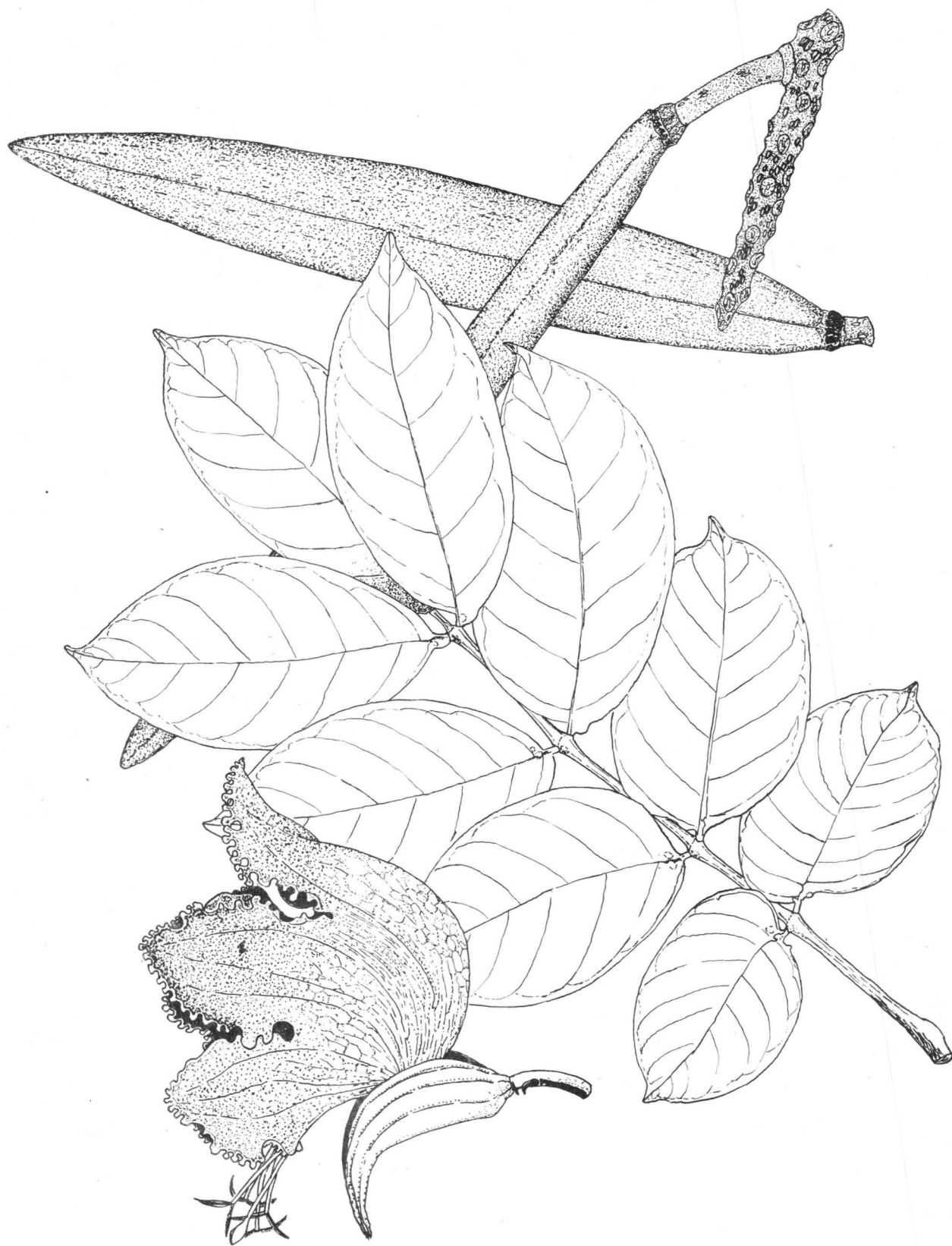
The swollen, tubular, greenish-yellow to purple flowers occur solitary or clustered on the trunk and branches. The limb or outer edge of the flower is lacerate or five-lobed. The flowers are 5 to 6 cm. in length.

The fruit, the well known calabash, varies greatly as to size and shape, being sometimes globose and comparatively small, and in other forms oval and up to 4 dm. in length. It has a thin shell which resembles a gourd, with a copious pulp full of large, thin seeds. The dry fruits are used by the natives for kitchen utensils, simple musical instruments, and containers for carrying water. The pulpy interior of the fruit is purgative and in Venezuela is said to cause abortion in cattle. It is used a great deal in domestic medicine, especially as a remedy for colds.

The tree is a favorite host for the cultivation of epyphytic orchids.

The wood is light brown, moderately hard and heavy, tough and durable, and fairly easy to work. It is used for ox-yokes, saddles, tool handles, and vehicle parts.

PLATE - 2/3 natural size.



BIGNONIACEAE

Spathodea campanulata Beauv.

Tulipán, Tulip tree,
Fountain tree

The tulip tree, native of west tropical Africa, is commonly planted for shade and ornament in Puerto Rico and elsewhere throughout the tropics.

It is a tall, erect tree, growing to 15 meters or more in height, with pinnately compound leaves of 7 to 17 ovate, acute leaflets, each 7 to 10 cm. long.

The large, bright, orange-scarlet, erect, cup-shaped flowers, borne at the tips of the branches throughout the season, render the tree strikingly handsome and conspicuous at a distance. The unexpanded flowers contain a quantity of secreted water, from which is derived the name, "fountain tree". Boys are seen occasionally using these as natural water pistols.

The fine, whitish, fluffy seeds are very small, numbering about 57,600 per pound, and each fruit contains about 470. The boat-shaped fruit capsules range in length from 2 to 3 dm., and because of their special form are used as toy boats by children in Java.

The wood is soft. In its native home the seeds are eaten, and the tree furnishes timber and medicaments, but use on the island has been restricted to that of shade and ornamentation.

Growth is very rapid. Measured specimens in the Forest Service Arboretum at Río Piedras have increased in diameter as much as 5 cm. in one year. It is inadvisable to plant this tree along roads and near buildings because old trees frequently become hollow. The tree thrives at high elevations and is well adapted to dry localities. Propagation is either by seeds or cuttings.

PLATE - 2/3 natural size.



BIGNONIACEAE

Parmentiera cerifera Seem.

Palo de vela, Candle tree

This tree is still rare in Puerto Rico, being of recent introduction from its native habitat in continental tropical America.

It is a small or medium-sized tree, growing to 10 meters in height and often several-stemmed from the base. The young twigs are slender.

The tri-foliate, light green, opposite leaves range in length from 6 to 12 cm. The leaflets are wider beyond the middle, thin, glabrous, and have entire or toothed edges. The long petioles are fringed with narrow tapering wings.

The bell-shaped flowers are greenish white, 6 to 7 cm. long, and are borne mostly along the larger branches and trunk.

The tree presents a very striking appearance when in fruit. The fruits are produced in abundance and hang from the stem and branches like so many candles. They are cylindrical, 30 to 100 cm. long, about 2 cm. thick, fleshy, smooth, bright yellow in color, and pleasantly fragrant, somewhat suggestive of the aroma of mellow apples. It is said that they are eaten in tropical America and that they are an excellent food for cattle.

Nothing is known of the wood.

PLATE - 2/3 natural size.



RUBIACEAE

Genipa americana L.

Jagua

Jagua is native to Puerto Rico, the Lesser Antilles, from Guadeloupe to Trinidad, and continental tropical America, but has been introduced into other tropical countries for its fruit. In Puerto Rico scattered individuals are found in pastures and woodlands at low elevations, and it is often planted in gardens for its fruit.

It is a medium-sized deciduous tree, growing to 20 meters tall and 6 dm. in diameter.

The large glossy leaves are opposite, attaining a length from 1 to 3.5 dm. with a short petiole about 1 cm. long. They are firm in texture, obovate to oblong, with an acute or short-pointed apex, and a narrowed base.

The large yellowish-white flowers are borne in short-stemmed cymes, and all open at the same time. They are tubular, about 2 to 3 cm. long, with obtuse, silky lobes as long as the tube.

The brownish, leathery-skinned fruit is oval in shape, about 5 cm. in thickness and contains an acid edible pulp. It makes a pleasant cooling drink but must be kept after picking until it softens before being used. The juice of immature fruit produces a brownish or blackish permanent stain, which was employed considerably by the primitive inhabitants of the continent for dyeing, and especially for painting the body.

The hard, heavy wood is of a dull brownish gray color, with a rather fine texture. It is strong and tough, works without difficulty, and finishes smoothly. It is rather difficult to season properly because it usually contains so much moisture, but it is suitable for a great many purposes. It finds use in the making of furniture, boxes, hoops, carriage-work, and in general construction.

PLATE - 2/3 natural size.



RUBIACEAE

Chione venosa (Sw.) Urban

Martín Avila

Outside of the island, this species is found in Hispaniola, in the Virgin Islands, in the Lesser Antilles from Monserrat to Tobago, and on the mainland in British Guiana. It occurs on the island on moist or wet sites at both low and high elevations, but is not common.

It is a small, rather densely leafy, evergreen tree, growing to 15 meters in height with smooth, dark bark. It is glabrous throughout.

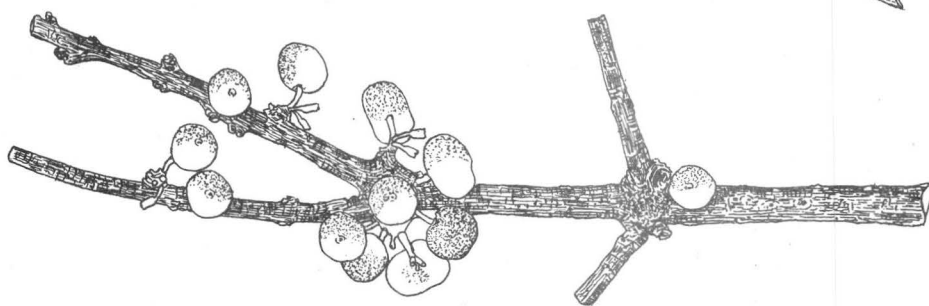
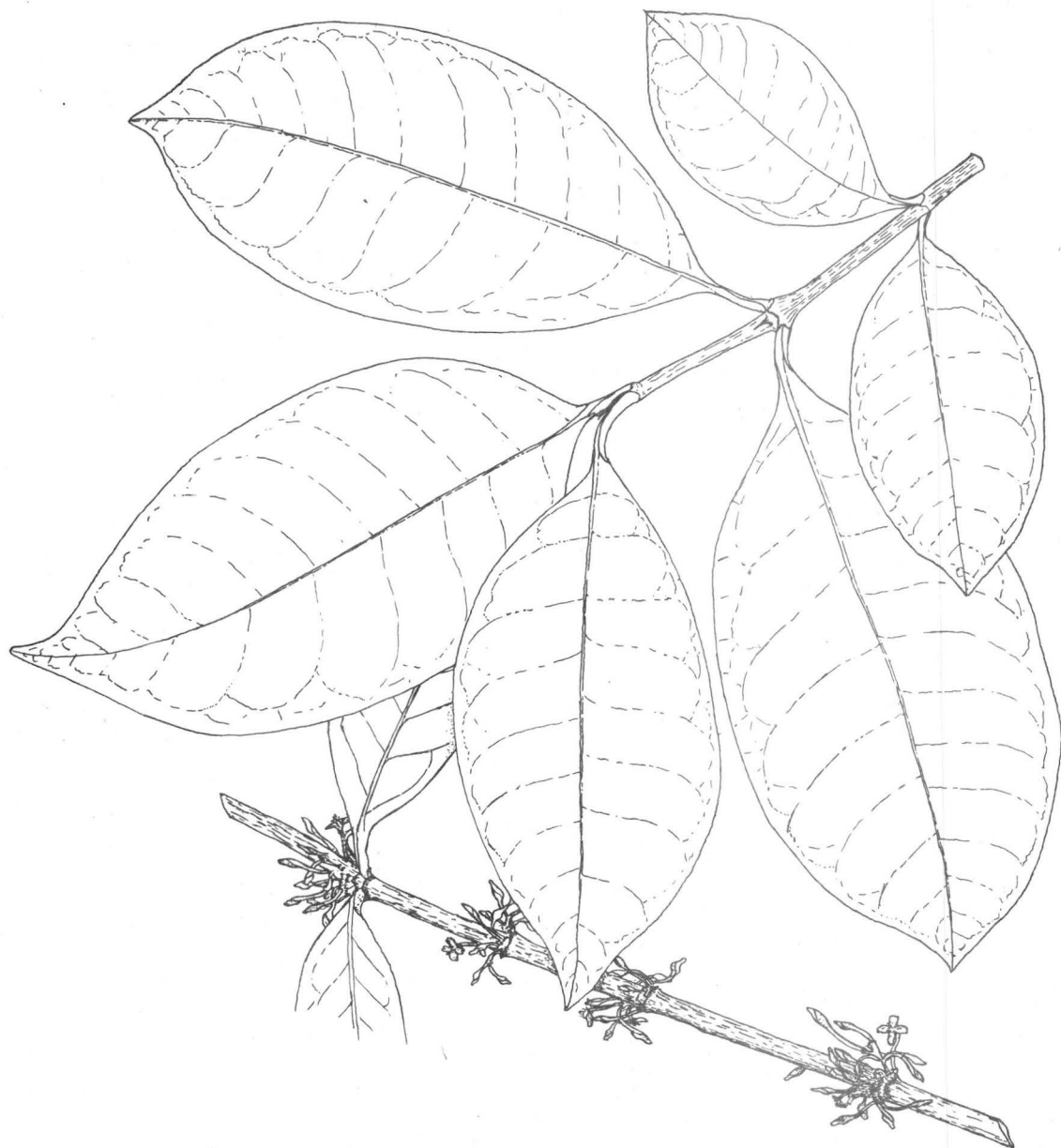
The simple, opposite, entire, leathery leaves are oblong to elliptic, 4 to 12 cm. long, narrowed at both ends, and have rather stout petioles 5 to 20 mm. long. They are faintly veined and dark green in color.

The small flowers occur in terminal panicles 5 to 8 cm. broad. The calyx is about 3 mm. long with 5 short teeth, the corolla is tubular, about 5 mm. long with 5 rounded lobes about half as long as the tube. They are pleasantly fragrant. The generic name "Chione" is the Greek word for snow, referring to the white flowers.

The fruit is an elliptical drupe 12 to 16 mm. long, dark purplish black at maturity.

Because of the scarcity of the wood it is seldom used and nothing is known of its qualities.

PLATE - 2/3 natural size.



RUBIACEAE

Ixora ferrea (Jacq.) Benth

Palo de dajao, Palo de hierro

This species is found in Cuba, Puerto Rico, the Virgin Islands, Tortola, from St. Kitts to Grenada, and in continental tropical America. It is quite common on the island in moist or wet districts, and ranges from low hills to high elevations.

It is a small, evergreen tree, 5 to 10 meters in height or often shrubby.

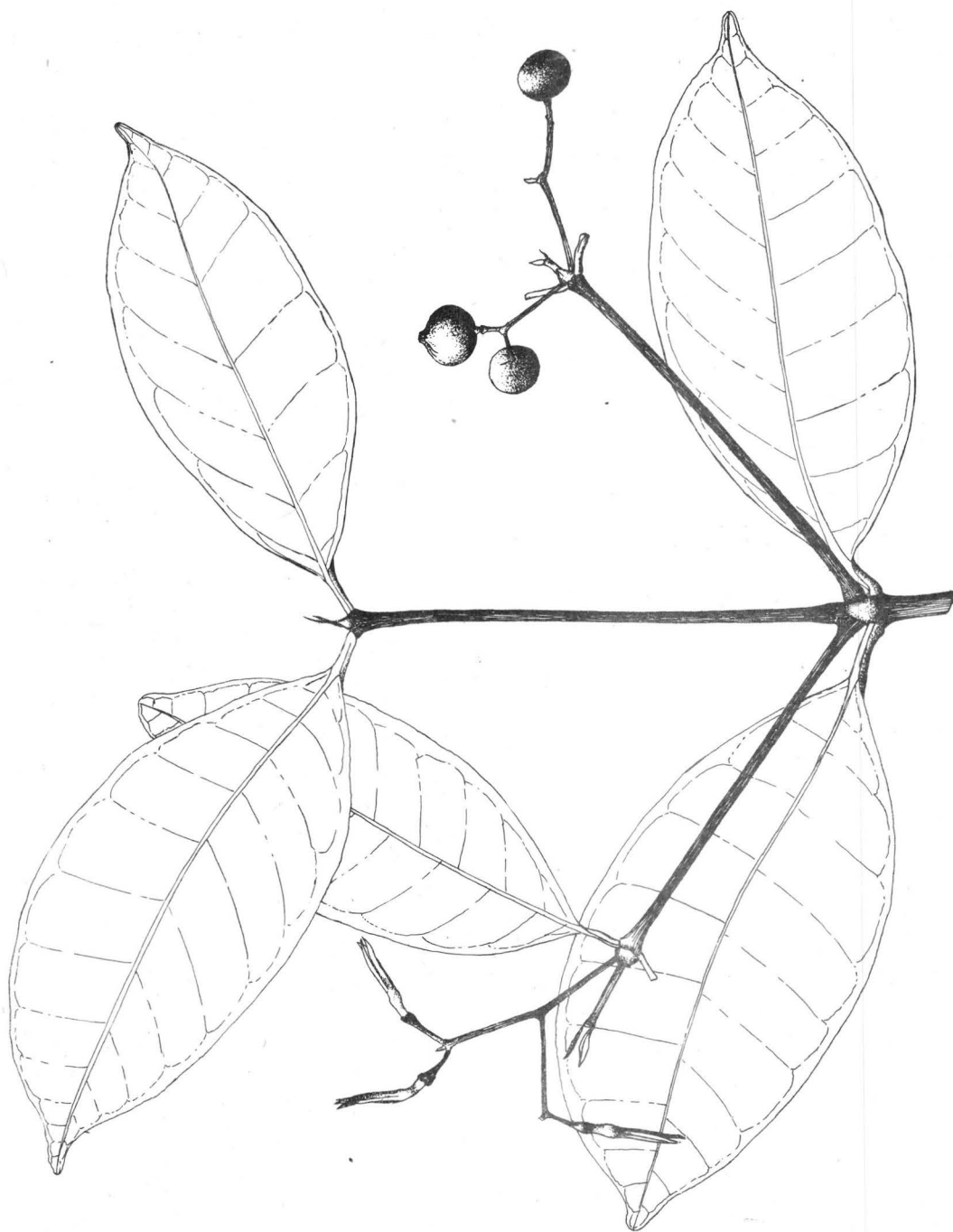
The simple, opposite, entire, somewhat leathery leaves are oblong to elliptic, 8 to 20 cm. long, with an acute or acuminate apex, narrowed or obtuse base, and stout petioles, 6 to 15 mm. long.

The flowers are rather small, but noticeable because they are strung out along the branches in clusters in the axils of the leaves or at the nodes between the leaves. The clusters are further subdivided into three-forked groups of flowers. The 4 whitish to red petals are united in a slender tube 10 to 12 mm. long. The flowers have a very pleasant fragrance.

The fruit is a globose berry about 10 mm. in diameter which is tinged with red or pink at maturity.

The dark brown wood is very hard, heavy, strong, and tough. Its use is restricted because of the small size of the trees.

PLATE - 2/3 natural size.



RUBIACEAE

Faramea occidentalis (L.) A. Rich

Palo de toro, Cafeillo

This species has a wide range, being found throughout the West Indies and in continental tropical America. On the island it grows in moist or wet areas at all elevations.

It is a small tree, growing to 15 meters in height, often shrubby, with rather slender twigs and glabrous throughout.

The simple, opposite, dark green, entire leaves are elliptic or oblong in shape 7 to 20 cm. long, abruptly acuminate at the apex, narrowed or rounded at the base, somewhat leathery, and they have short petioles. The stipules are rounded and terminated with a bristle about 1 cm. long. The two bristles at the terminal bud are crossed.

The rather small white flowers occur in small clusters. Their pleasant fragrance can be noted even at some distance from the tree. The petals are united below in a tube about 10 mm. long with linear-lanceolate lobes also approximately 10 mm. in length.

The one-seeded fruit is nearly globose, about 1 cm. broad, and turns black on maturity. The seeds are brown, 8 mm. wide, deeply hollowed below, and they have a cross-shaped furrow extending from the depression.

The wood is yellow, hard and close-grained, and is used on the island only as firewood.

PLATE - 2/3 natural size.

GLOSSARY

- Acuminate. Drawn out at the apex into a long slender point.
- Acute. Terminating gradually in a sharp point.
- Alternate. Not opposite each other on the axis but at different heights.
- Areolate. Divided into angular spaces; reticulate.
- Aril. A small appendage from or around the scar on a seed.
- Armed. Bearing spines, prickles, or thorns.
- Axil. The angle formed by a leaf or branch with the stem.
- Axillary. In or from an axil.
- Buttress. An aerial outgrowth derived from root and stem which joins the lateral roots to the trunk, and acts as a support for the latter.
- Capsule. A dry dehiscent fruit (pod).
- Crenate. Furnished with rounded marginal teeth; said of leaves.
- Cyme. A flower cluster in which the flower opens from the center outwards.
- Deciduous. Falling off; not persistent.
- Dehiscent. Splitting open by valves or slits; said of anthers and capsules.
- Drupe. A stone fruit.
- Entire. Without marginal serrations or teeth.
- Epiphyte. A plant growing upon another (not parasitically) for support, generally not attached to the ground.
- Glabrous. Smooth, not pubescent or hairy.
- Globose. Spherical.
- Indehiscent. Not splitting open; remaining closed.
- Lacerate. Irregularly torn along the edges; said of leaves.
- Lanceolate. Lance-shaped; broadest over the middle and tapering at the ends.
- Latex. Milky sap.
- Lenticel. Lenticular corky growths on young bark.
- Linear. Long and narrow.
- Midrib. Central or main vein of a leaf.
- Node. The portion of the stem which bears a leaf or whorl of leaves.
- Obcordate. Inversely heart-shaped.
- Oblanceolate. Inversely lanceolate.
- Oblong. Rectangular in general outline but with the ends rounded.
- Obovate. Inversely ovate.
- Obtuse. Bluntly rounded at the end.
- Orbicular. Circular.
- Ovary. The female organ of the flower.
- Ovate. Egg-shaped.
- Ovoid. Oval in outline.
- Palmate. Shaped like a palm-leaf.
- Panicle. A loose, compound flower-cluster.
- Pedicel. The flower-stalk.
- Peduncle. The stalk of an inflorescence.
- Petiole. Foot-stalk of a leaf.
- Pinnate. A leaf with leaflets arranged along each side of a common petiole.
- Pistillate. Said of a unisexual flower without fertile stamens.
- Pith. The soft cylinder of cells lying in the center of stems and branches of trees.
- Pubescent. Clothed with short, soft hairs.

Punctate. Marked with very small dots or glands.
 Raceme. An indeterminate inflorescence composed of a primary axis bearing pedicelled flowers.
 Rachis. The axis of an inflorescence or of a compound leaf.
 Radicle. The undeveloped root of an embryo.
 Serrate. Having sharp teeth on the margin, and directed forward.
 Sessile. Without a stalk.
 Simple. Not branched (stem); not compound (leaf).
 Spathulate. Spoon-shaped.
 Spike. An elongate floriferous axis bearing sessile flowers.
 Staminate. Bearing stamens.
 Stellate. Star-shaped.
 Stigma. The distal end of the style, more or less enlarged, on which pollen grains alight and germinate.
 Stilt-roots. Root developed from the stem of certain trees, reaching to the ground and then developing normal roots.
 Stipule. A leaf-like appendage of the base of the petiole of leaves.
 Style. The contracted upper part of the ovary which supports the stigma.
 Umbel. An inflorescence with numerous pedicels springing from the same point like the rays of an umbrella.
 Variegated. Leaves which are partly pale in color.
 Viability. The potential capacity of seeds to germinate.
 Whorl. A ring or circle of organs inserted around an axis—as the organs of a flower or leaves on a stem.

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